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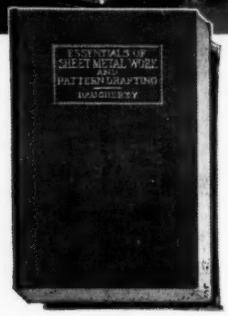

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INDUSTRIAL-ARTS MAGAZINE

Vol. VIII JANUARY, 1919 No. 1

OUTLINING A MANUAL ARTS COURSE FOR THE FIRST EIGHT GRADES

Frank M. Leavitt, Associate Superintendent of Schools, Pittsburgh, Pa.

FOR many years the organizing of a manual arts course has been a frequently recurring problem in the school systems of the country. In the larger cities one sometimes finds a course that has been in force for several years, but in the smaller places, where the personnel changes considerably from year to year, a new superintendent of schools or director of manual training is often put to the necessity of developing a new course of study for one or all of the first eight grades, or of revising an old and unsatisfactory one.

If a newly elected superintendent wishes to establish a manual arts course, or if he seeks to reorganize an old one, he will find it difficult indeed to place before his board or to commend to the attention of his subordinates an outline of a course which he knows to be widely approved or even widely known. A few general principles may be accepted as representing the "idea" of manual training such, for example, as the statement that "manual training is mental training." Also certain common practices may be observed and so be considered to represent "standard" practices as, for example, the prevalence of woodwork in grade eight. But there is practically no basis of commonly accepted, standardized theory or practice on which a school officer may form a course of study with entire confidence. In other words there is no such common understanding of the purposes and practices of instruction in the manual arts as can be found in most of the socalled academic studies now taught in the elementary school.

Of course it is possible to find disagreement among teachers as to the chief reason for teaching any of the socalled "regular" subjects, but the divergence of opinion is not wide as compared to the variety of purposes or objectives urged by different advocates of manual training. It is the main thesis of this paper to maintain that there can be no such thing as sanity in our manual training instruction, and that there can be no possible way of testing the efficiency of manual training work, until there can be stated with great clearness the purpose or purposes for which the work is being done, or in other words until we can fix the objectives which the instructors should strive to reach.

With this thought in mind, a committee of educators undertook (in 1917-18) to study, to combine and to "reduce to their lowest terms" a number of purposes that have been urged by a great variety of writers and lecturers on the philosophy of manual training during the last 25 years. While the committee does not claim to have made an exhaustive study of the question it is believed that the results of its work may well be taken as a starting point for further study. The committee reached three rather obvious conclusions as follows: First, that the purposes listed in their report are capable of being combined, one with the other, and so reduced in number or, on the other hand, of being still further subdivided and thus increased in number. Second, that the purposes vary in importance, some being commanding and others being quite secondary in nature. Third, that a purpose may be of prime importance in one grade and of comparatively minor importance in another.

As an aid to the discussion of this question, the several purposes or objectives of instruction in the manual arts as listed by the committee, are given. It should be said that, purposely, the order in which they stand has no reference whatever to their relative importance. The nine objectives follow:

1. To develop handiness.
2. To promote the immediate carrying over of ideas into action.
3. To help to discover special interests and aptitudes important for vocational guidance.
4. To provide a means for developing technical skill.
5. To provide a means for imparting technical knowledge.
6. To enable the pupil to apply the test of practice to some of his thinking.
7. To develop the mind by providing constructive problems, in materials, which demand a vigorous mental reaction.
8. To interest in school work those pupils to whom the traditional studies do not appeal strongly.
9. To create interest in the arts and industries without any reference to their vocational significance.

The thesis of this paper is that the only intelligent way to outline a course of study in the manual arts is to determine, in the first instance, what the objectives of the work of each grade shall be, and then to decide which of these objectives are paramount and which are merely secondary. No claim is made that the nine objectives given above are the only objectives that might be urged for adoption but it is claimed that these or other purposes must be accepted first before any intelligent discussion regarding the

outline or the "content and method" of a course of study in the manual arts can be had.

After the main objectives have been determined questions may be asked regarding "materials," "models," "projects" and the like. The last twenty years have seen the publication of many magazine articles and not a few books on one or another phase of the subject. Many of these articles and books are replete with excellent examples of projects that will help the teacher carry on the work in such a way as to accomplish the desired purpose—to reach the specific objective. The contention of this paper is that the objective is not likely to be reached *if it is not seen and appreciated.* It is our purpose to discuss the plan of making the outline, rather than the way of selecting materials, models, or projects. These matters and also the question of methods are discussed only indirectly. The main topic of discussion is the *method of making an outline.*

The Philosophy of Manual Training.

Certain prominent philosophers of education in America, notably Francis W. Parker, Charles W. Eliot and John Dewey, as well as the earlier educational reformers, have shown with clearness that the school work of all children should include some manual activities. What we have described loosely as "manual training" has been advocated by thinkers of this type for nearly two centuries as an *essential* in the general education of all children. The *theory* of educational hand work, which is not always evident in manual training practices, is so widely known and so commonly accepted that it need not be discussed here. Instead let us assume that it is agreed by all, that manual training is justifiable on the ground that it provides an essential element in the education of the individual regardless of his future vocational interests or probable career.

With the beginning of the twentieth century, there came an emphatic demand that this school activity known as "manual training" be turned to practical account as "vocational education," that is to say that it be given as a specific rather than as a general training for a vocational rather than for a cultural end. Obviously such specialized objectives were not suggested as being appropriate for all pupils but were urged for those pupils who were likely to enter into industrial life at an early age and without receiving the benefits of a "full high school course" supplemented by a term of vocational training. The difficulty of differentiating between the vocational and the cultural purposes of hand work, and the even greater difficulty of distinguishing between those who should have the cultural and those who should have the vocational courses, has been a stumbling block in the pathway of educational progress during the past twenty years.

A word regarding one of the main objectives of American education is not out of place at this point, in fact it is peculiarly pertinent to the question under discussion. It will be recalled that many advocates of industrial education have tried to induce the American schools to adopt the German system which, from one point of view, has been extremely "efficient." One of the keenest observers of American education said, after a study of the German schools, that the fundamental difference between the American and the German systems was that German education was a "habit-forming" education, while American education was a "judgment-forming" education. A moment's reflection will show that we have here one of the fundamental differences between specific industrial training and that general education which manual training is expected to advance.

Professor William James, who undoubtedly should be accepted as an authority on habit since the theory of habit formation was the central thought in his work on psychology, gave as a rule for habit formation the admonition to make a strong first impression and never to permit an exception particularly in the early stages of training.

Professor Frank M. McMurry once spoke as follows about the educational value of manual training: "It is only when one has experienced the shock of misfit between what he has thought will hold, on the one hand, and what he finally finds to be true, on the other, it is only then that one is really sharpened to the point of developing good judgment. Leave out the test of practice and people can think all sorts of things and be entirely wrong. We need headers such as practice brings. Manual training, because it provides this test, is superior to many other subjects."

It is obvious that specific trade training must develop the "habits" of the trade, while manual training, given for general educational purposes, must provide opportunity for experimentation and thus opportunities for making mistakes in order to develop that judgment which is one of the main objectives of American education. It may be well to say, at this point, that industrial education, as carried out in America, does not confine itself solely to habit formation, but habit formation is a much more important element in such training than it is in general education. Conversely, that type of general education which goes to the extreme of failing to establish any habits whatsoever, and we have often seen such education exemplified, is something less than intelligent to say the least, but general education, and manual training as a part of general education, must and generally does emphasize the judgment forming method rather than the habit forming method. A little reflection will convince anyone that these methods are, necessarily, rather widely opposed to each other.

The problem which we have before us is to differentiate between the *main objective* and the secondary or relatively unimportant objectives at each point in the school course. Differentiation on the basis of objectives should also be made between the

several grades. Much thought has been given to the question as to the grade or grades where the manual training should cease to emphasize the general *educational* phases of the work and begin to stress the specific, habit forming, industrial *training*.

Those who have had most to do with the shaping of thought in the United States on this question are in substantial agreement that the following rough classification, by grades, may be made. During the first six grades the purpose may be wholly educational without reference to the future destiny of the different pupils. Of course the manual training work given in these grades may be of some slight vocational value to a few individuals, but the vocational objective has no place in the organization of the course of study, at least for those children who make normal progress thru the grades.

At the other extreme, that is during the high school years, the vocational objective should be provided for in the case of the majority of high school pupils. Of course many high school students will continue to elect manual training courses, for various reasons other than because they believe them to have vocational significance, but undoubtedly the "making-a-flower-pin-for-mother" idea should be eliminated from the high school. With equal certainty it may be affirmed that specific industrial training should be provided for large numbers of boys in the modern American high school.

Between the general educational work of the first six grades and the specific industrial training of the high school period there is a sort of neutral ground where a combination of the two types of training may well be employed. By general acceptance one purpose or objective of the work of these grades may be designated as "prevocational," that is to say specifically preparatory to vocational courses.

From the above it will be seen that industrial training, as a genuine and complete preparation for industrial efficiency, has no place whatever in the discussion of manual training in the elementary schools. Furthermore it will be clear that we should attempt to distinguish between the strictly educational and the prevocational objectives in the manual training program of the elementary school. Therefore it may be well, in passing, to make the following statements with regard to prevocational work.

First, the best organization for carrying out prevocational principles is the junior high school, since that organization permits of a great variety and amount of shopwork, thus enabling the school to try the pupil out in a number of trade experiences.

Second, where there is no junior high school organization, prevocational work should be introduced into some elementary school for over-age pupils and for other of the more mature pupils of whom it is certain that their school days are numbered.

Third, the work of grades seven and eight in the ordinary elementary school should be organized with a clear understanding of the prevocational possibilities even if a plan of diversified work, such as is possible in the junior high school, cannot be adopted.[1]

With the foregoing discussion as a background, it is proposed to assign to each of the several grades of the elementry school the major objectives of the manual arts work of that grade as well as some of the secondary but still important purposes.

The First Four Grades.

The manual training work of the first four grades should be carried on as an extension and development of the kindergarten principles of co-ordinating the children's conceptions of work, play and education. Stated in the terms of our "nine purposes" the main objectives of these four grades may be said to be Nos. 2 and 1. In other words the work should be of such a nature and should be conducted in such a way as to secure immediate and vigorous reactions, both mental and manual, and to develop co-ordination of the mind and hand. The evidence that such ends are being accomplished is to be found in the readiness of the children to undertake to do happily and spontaneously a great variety of things with the hands as opportunity offers or as occasion demands.

The secondary purposes of manual training work in these grades may be given as purposes Nos. 8, 6 and 7. Number 8 deserves a word of comment. The statement as it stands implies that the manual training work gives encouragement to children who have learned to distrust themselves because they have found the academic work at the school desk to be beyond their grasp or at least have found it irksome. In the grades in question handwork should be given as a *preventive* of this state of mind, not as an encouragement to those who have fallen into it. If properly presented, handwork may prevent the child from developing a distaste for the less active study or bookwork.

The work of these grades is frequently carried out in a school system under the supervision of the art department. The work is then handled by the grade teacher who, since she is a child specialist, rather than a subject specialist, is able to correlate and co-ordinate this work with all other school activities much better than a special manual training teacher could do it. Without such co-ordination the work may become lifeless and meaningless to the young children. It is debatable whether the work of a "subject specialist" can ever be entirely satisfactory in these grades. There is no good reason why the supervisor who directs the art work of these grades may not direct equally well the constructive or manual training work, while there are several good reasons why the two should be combined under one supervisor provided always that the supervisor herself is properly trained for this work.

The manual training work of the first four grades

1 See "Prevocational Education in the Public Schools," Leavitt and Brown, Houghton Mifflin Company.

has been more nearly standardized than that of other grades. Certainly there is less danger of misunderstanding the purpose of the work and of employing inappropriate methods in carrying it forward. A number of good books have been compiled or written outright for the guidance of the teachers of these grades. One of the best of these, to mention only one as illustrative, is "Primary Handwork" by Ella Victoria Dobbs, professor of manual arts, University of Missouri.

Grades V, VI, VII, and VIII.

In most communities it will be found desirable to assign the instructional work of grade five to the grade teachers and the work of grades six, seven, and eight to specially trained teachers of the manual arts. For this reason there should be provided for grade five a form of handwork that may be carried out in the regular classroom and that can be easily comprehended by the grade teacher.

In considering the discussion which follows, it is necessary to keep in mind that the work of grade five is to be taught by the grade teachers while the work of the other three grades is to be taught by manual training teachers.

One other general consideration must be urged. In the opinion of the writer, the position that there is "one best method" of organizing and conducting manual training courses in these grades is indefensible. That course will be the best in any given situation, however, which has the most clearly defined and the most intelligently selected purposes or objectives for each grade, and which finds, adopts or develops methods for reaching those objectives. It is equally necessary to provide effective means for measuring the results in order to determine if the objectives have actually been reached.

Conversely, no course will be a good course that lacks these well defined objectives, methods and tests, no matter how attractive may be the "models" placed on exhibition at the close of the school years.

The purpose of what follows is to set forth a series of objectives for grades five, six, seven, and eight, which will provide for a progression of "ideas" from grade to grade and which will actually constitute an outline of a course of study. This outline may be filled in in a variety of ways, employing different "models" or "projects" but successful work in one grade will form a reasonable foundation for the work of the succeeding grade. In this discussion the figures 1 to 9 are employed to designate the purposes listed earlier in this paper.

Grade Five.

The objective of the manual training work of grade five, in the outline suggested in this paper, are purposes 7, 6, 2, 1, and 8.

The Main Objectives. (Purpose 7.) To develop the mind by providing constructive problems in materials which demand a vigorous mental reaction." Work carried on for this purpose would develop in the boy an attitude of mind which may be indicated thus: "Here is something that must be done. *How* shall I go to work to do it?"

(Purpose 6.) "To enable the pupil to apply the test of practice to some of his thinking." This is closely related to purpose No. 7 and would develop an attitude of mind indicated thus: "Let's try it out." This is distinctly different from the attitude of mind that prompts the boy to say, "I wonder how this is to be done. Let's ask teacher," or that attitude of mind which prompts the pupil to sit, perhaps with folded hands and untroubled brow, until he is "told what to do."

A Secondary Purpose. (Purpose 2.) "To promote the immediate carrying over of ideas into action." The peculiar significance of this statement with regard to the outline here under consideration lies in the emphasis on the words "immediate" and "action." The inference is that only such ideas should be stressed in any instruction given as can be carried out at once, that is, "carried over into action," thoughtful, purposeful and immediate.

Minor Considerations. Important considerations in any manual training course but not *determining* characteristics in the fifth grade outline here under consideration are:

(Purpose 1.) "To develop handiness."

(Purpose 8.) "To interest in school work those pupils to whom the traditional studies do not appeal strongly."

Practical Characteristics of Models or Projects. Any manual training work given with the specific purpose of reaching these objectives must possess the following characteristics:

1. Processes must be varied.
2. They must be simple and therefore easily comprehended and such as may be applied by the pupils themselves without too much dictation and oversight by the teacher.
3. The projects or models must be of such a nature that the pupils can judge readily as to the degree of excellence of the results attained.
4. The projects must be such as can be completed in a reasonably short time.
5. They must be such as can be designed or modified easily by the children themselves so that each pupil may have what amounts to an individual problem.

A good example of a fifth-grade course which presents all of the above characteristics is fully described in a little manual entitled "Bookbinding for Beginners," by Florence O. Bean, and published by the Davis Press, Worcester, Massachusetts.

Grade Six.

The objectives of the work of grade six, as considered in this outline, may be expressed by the figures 9, 1, 2, 6, 8, and 3.

The Main Objectives. (Purpose 9.) "To create interest in the arts and industries without any refer-

ence to their vocational significance." At this point it is desirable to introduce the pupil to a variety of materials and, incidentally, to a variety of processes fundamental to different arts and industries. Work of this nature should widen the social horizon of the pupils by giving them a glimpse of a number of occupations.

(Purpose 1.) "To develop handiness." Considered in its relation to purpose 9, this would mean that the pupil's manipulative ability should be developed measurably by his contact with such a variety of materials and processes.

Secondary Purposes. (Purposes 2 and 6.) "To promote the immediate carrying over of ideas into action." "To enable the pupil to apply the test of practice to some of his thinking." These two purposes should be continued as objectives but should be decidedly subordinate to purposes 9 and 1. The significance of this statement lies in the fact that the pupil will be called upon to make the acquaintance of materials and processes rather than to apply himself to constructive problems involving these materials. The processes in each case must be elementary and, as the time devoted to each different type of work is extremely limited, most of the work must be done before the problem-solving stages can be reached. It is to be assumed that the pupil, in the course of his fifth grade work, will have developed the desire and the ability to attack simple constructive problems. The work of grade six should build upon this problem-solving ability rather than to make any special effort to develop it.

Minor Considerations. (Purpose 8.) "To interest in school work those pupils to whom the traditional studies do not appeal strongly." This purpose is as pertinent here as in grade five but is relatively unimportant.

(Purpose 3.) "To help discover special interests and aptitudes important for vocational guidance." This purpose is of doubtful importance in grade 6, tho it is desirable that special interests and aptitudes be noted for future reference if any such should be observed.

Practical Characteristics of Models or Projects. Models or projects suitable to embody the above principles must be simple in construction and should involve little tool technique. A sufficient variety can be secured by employing as materials wood, splints for weaving, strap or sheetmetal, clay or plasticine, plaster and fine concrete and cement.

Grade Seven.

The objectives of the work of grade seven, as considered in this outline, may be expressed in purposes 4, 9, 1, 8, 6, and 7.

The Main Objectives. (Purpose 4). "To provide a means for developing technical skill." For psychological as well as for logical reasons grade seven may well adopt as its paramount objective the development of a genuine trade technique, tho not for vocational purposes. It is impossible, obviously, to develop the techniques of several trades or industries but it is possible to select one such trade or industry and treat it as illustrative of the principles governing trade technique in general. The boys in this grade are just entering adolescence and it is possible to interest them in the "manly" way or the "trade" way of doing a piece of work, that is in the development of a trade technique. Even tho the vocational significance of the work may not be important for the boys in question, it is highly desirable to emphasize this question of trade technique for social and educational reasons.

(Purpose 9.) "To create interest in the arts and industries without any reference to their vocational significance." The work chosen for this grade may exemplify only one industry and still fulfill, at least partially, purpose 9.

Secondary Purposes. (Purpose 1.) "To develop handiness." It should be an important tho a secondary purpose to develop as much special hand skill as possible in the one industry selected rather than to develop a general handiness. This throws purpose 1 into the list of secondary objectives.

(Purpose 8.) "To interest in school work those pupils to whom the traditional studies do not appeal strongly." On account of the fact that so many boys reach the end of the period of compulsory attendance while they are in this grade, this purpose is raised from a relatively unimportant position to a position that is at least secondary. By putting into the school work subjects having a special industrial content and by employing methods that savor of the practical industrial shop, many a pupil may be kept in school over this critical period.

Minor Considerations. (Purposes 6 and 7.) "To enable the pupil to apply the test of practice to some of his thinking." "To develop the mind by providing constructive problems, in materials, which demand a vigorous mental reaction." These purposes will be inherent in any work that is carried out in strict accordance with the above stated principles and will be as prominent as need be without placing any special emphasis upon them. For that reason they may be considered as of minor importance.

Practical Characteristics of Models and Projects. In most school systems woodworking equipments have been provided for grades seven and eight. For this reason, if for no other, woodworking might well be selected as the industry by which to illustrate the development of tool and trade technique. There are many other reasons which might be given for utilizing woodworking in this way but a recital of them is not pertinent to this discussion. The technique of the typical woodworking trades, particularly of cabinet making and joinery, will serve excellently not only the main objectives of this grade but all of the less important purposes.

The models selected should be such as will de-

mand the use of truly typical woodworking tools and the methods employed should be such as to show, step by step, the correct use of these tools especially in the primary, fundamental processes.

Grade Eight.

The objectives of the manual training work of grade eight, as considered in this outline, may be expressed in purposes 5, 4, 8, 3, 6, and 7.

The Main Objectives. (Purpose 5.) "To provide a means of imparting technical knowledge." By "technical knowledge" is meant, in this connection, an understanding of those mechanical, mathematical and scientific principles which are intimately involved in the practical constructive work of the particular trade or industry in question. In giving this knowledge, opportunity is provided for correlation with the mathematics, drawing and science work of the eighth grade and marks a step in advance of the objectives of grade seven, namely, technical *skill.* The practical aspect of this attempt to give technical knowledge would be seen in the practice of referring the pupils to books and other reference matter for aids in solving the constructive problems involved in their work.

(Purpose 4.) "To provide a means of developing technical skill." The main objective of the previous year is still important here but is modified by the considerations discussed above. That is to say, knowledge rather than skill is the paramount issue.

Secondary Purposes. (Purposes 8 and 3). "To interest in school work those pupils to whom the traditional studies do not appeal strongly." "To help discover special interests and aptitudes important for vocational guidance." These purposes are of almost equal importance in the work of this grade because at this time the boy is in need of vocational guidance and particularly that kind of guidance that will lead him to enter high school and to select wisely from the vocational courses there offered.

Minor Considerations. (Purposes 6 and 7.) These purposes have about the same relative importance as in grade seven and, as stated above, will inhere in any course which fulfills the other requirements of this grade and therefore need no special emphasis.

Practical Characteristics of Models and Projects. To reach the above named objectives the work of this grade should be carried on in such a way as to reduce class instruction to a minimum and consequently to afford considerable latitude to individual pupils in the choice of models or projects. In most instances such models should be selected from an approved list, the instructor being careful to see that each model is well adapted to the abilities and requirements of the individual pupil in question. Community and group work should be encouraged and visits to industrial plants should be contemplated in the plan of work.

In Conclusion.

A re-examination of the main objectives of the manual arts work of the several grades of the elementary school, as given above, will show that each of the most significant purposes receives special emphasis for one year and then is relegated to a less important place. A study of the relative position of these various objectives during the progress of the course will furnish considerable food for thought even tho the reader may differ in his own estimate of the relative importance of the several objectives. It is safe to say that the course that succeeds in making an intelligent distribution of these purposes will have much to commend it to the thoughtful superintendent.

YOUTH should be a season of instruction in industry and the useful arts, as well as in letters and the sciences mastered by their aid. Each child should be trained to skill and efficiency and productive labor.

Horace Greely.

POST-WAR ACTIVITIES IN THE SCHOOLS

Bonnie E. Snow and Hugo B. Froehlich

(Article 4)

THE SCHOOL SALE OR BAZAAR.

THE authors of the articles on War Time Activities in the Schools have been besieged recently with inquiries as to plans for the organization and management of a School Sale or Bazaar. The number of such letters received indicates that interest in the idea of the School Bazaar is widespread. This is not surprising, for we know that appeals for money to carry on the splendid work of the various patriotic and benevolent organizations are now heard on every side, and he is indeed a slacker who would turn a deaf ear to them. Even when the guns are silenced, when the insidious submarine has slunk away to its nefarious base, and when the dawn of peace spreads over the world's darkness, the great work of reconstruction will need all our effort and all the money we can spare. The Junior Red Cross will pursue its work after the war, for it will still participate in community, national and world citizenship, believing as it does that active service is the best kind of education.

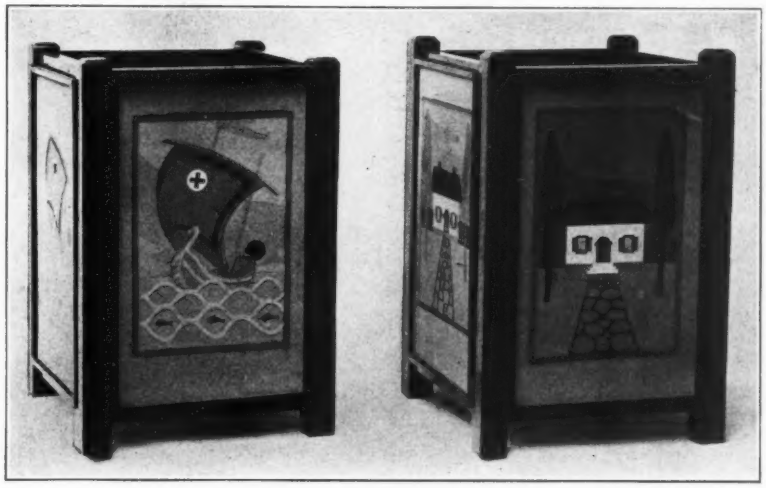


Fig. 1. Waste Baskets Decorated with Panels in Designs of Colored Papers.

The School Bazaar is usually carried on in the interests of the Junior Red Cross. In several cities boards of education have been glad to donate material such as is usually provided for manual training, sewing, art and cooking classes, and have permitted the time allotment for these studies to be used for a limited period in making articles that could be offered for sale. Probably no other one enterprise that has ever been fostered and developed in our public schools has been productive of such good as the School Bazaar. In the first place, it has brought the heads of departments together in planning the different articles that each department could make,—articles that would be attractive and salable. It has demonstrated the interdependence of the departments. The cooking department desired attractive boxes for jellies, preserves, pickles, candies, nut meats, cakes, and all sorts of good things to eat, and in providing unique wrappings and containers for these confections the art department added materially to their sales. The sewing department needed new designs and patterns for aprons, children's dresses, lingerie and table linen, and the supplying of these needs provided "motivation" for classes in art. The manual training department built waste baskets, sewing stands, bird houses and wall cabinets, turning them over to the art department to decorate. Thus at one stroke the School Bazaar has leveled the barriers that have existed for years, separating the art department, the manual training department, the sewing department, and the cooking department. The war has knocked common sense into our heads, concerning the management of the manual activities. How absurd it seems to us now when we hear supervisors complain that they can secure no co-operation! All the world is co-operating today, in efforts to secure the greatest good to the greatest number.

Again, the management of the Bazaar became a co-operative affair. The manual training department attended to packing and transportation, and built booths, shelves and counters. The art department made posters announcing the sale, and gave definite suggestions as to arrangement and display of all classes of articles. The sewing department affixed tags and helped in the marking of prices, etc. The cooking department gave interesting demonstrations in the preparation and serving of food. The cooking classes served tea, ice cream, and in some instances light luncheons. The whole history of the School

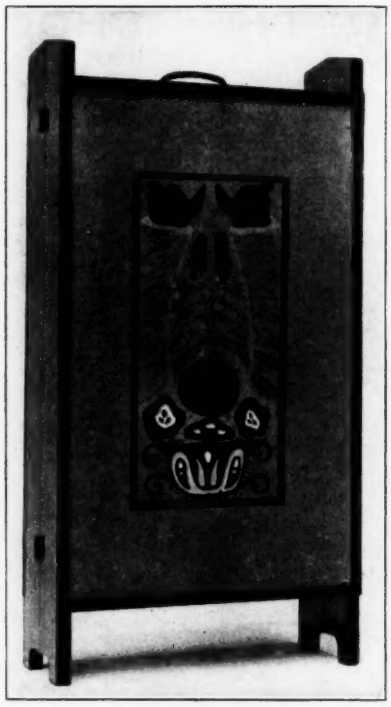


Fig. 2. Sewing Cabinet with Panels of Cardboard Decorated with Designs, Painted in Show Card Colors.

Bazaar represents an unparalleled "get-together" movement, with a common aim of helping to win the war. May this spirit of sympathy, co-operation and service in meeting the needs of the hour abide with us in times of peace!

A detailed account of the organization of the School Bazaar in a specific city may be more helpful than general suggestions. Early in the year, the board of education of the city of Newark authorized the holding of a bazaar in which articles made by school children, under instruction, were to be offered for sale, the proceeds to be given to the local chapter of the Junior Red Cross. The only stipulations made by the school authorities were that the requirements of the courses of study in the various departments were to be met, and that no extra school time was to be used by the pupils in carrying out the projects. Consultations with the Junior Red Cross officers were at first frequent. From the treasury of this organization were to be advanced such amounts of money, not to exceed a total of $500, as seemed necessary for the purchase of extra materials required for the making of articles in greater numbers than the school courses permitted. Felts, yarns, paints, percales, muslins, embroidery cottons, permadello, lumber, and hardware came under this head. With the backing of the board of education and the provision of necessary funds for materials as a basis for work, a meeting of the supervisors of the different departments of manual arts was called. At this meeting the supervisors all agreed that a sale of the kind proposed would demonstrate to the public the fact that industrial art was a practical art, and could be made to function in as definite and tangible way as a printing press or a steam engine. The supervisors also went on record as declaring that they were willing to compete, in quality, workmanship and artistic effect in the articles made by the children under instruction, with the commercial products of the market. Three principles were to control the selection and making of articles for the sale; first, the educational requirements were to be observed; second, the articles made should bear the stamp of child interest; and third, the articles made should attract the public and meet its needs. Lists of articles suitable for the sale, and already forming a part of the course of study, were then prepared. A few other articles were added to these lists. Then the matter of quantities and apportionments was studied. Newark is a city of 400,000 inhabitants. There are seventy buildings and two thousand teachers in the elementary and high schools. At present there are eight alternating schools, where classes in the manual arts above fourth grade work in daily eighty-minute periods, in ten-week shifts. Under these conditions the following lists of articles and numbers of articles did not prove to be burdensome:

LIST OF ARTICLES PLANNED FOR THE SCHOOL BAZAAR.

600 Rag Dolls, made in third grades, pattern for body given; snips for stuffing, prepared in first and second grades; dresses made in fifth grades; faces painted by selected pupils in eighth grades.

300 Wooden Dolls, made in manual training department, sixth grades; dresses made by sixth-grade girls; faces painted in eighth grades.

500 Window Jambs, sawed out in fifth grades, painted in eighth grades.

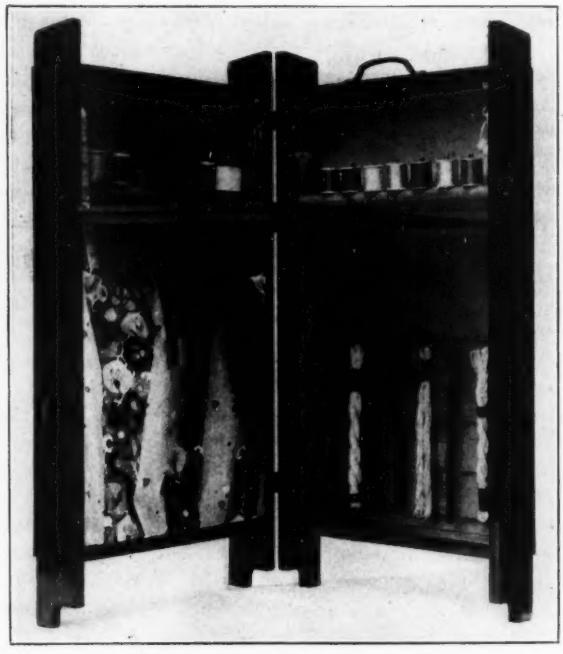


Fig. 3. Interior of Cabinet showing Adjustable Shelf, Cretonne Pocket and Disposition of Sewing Materials.

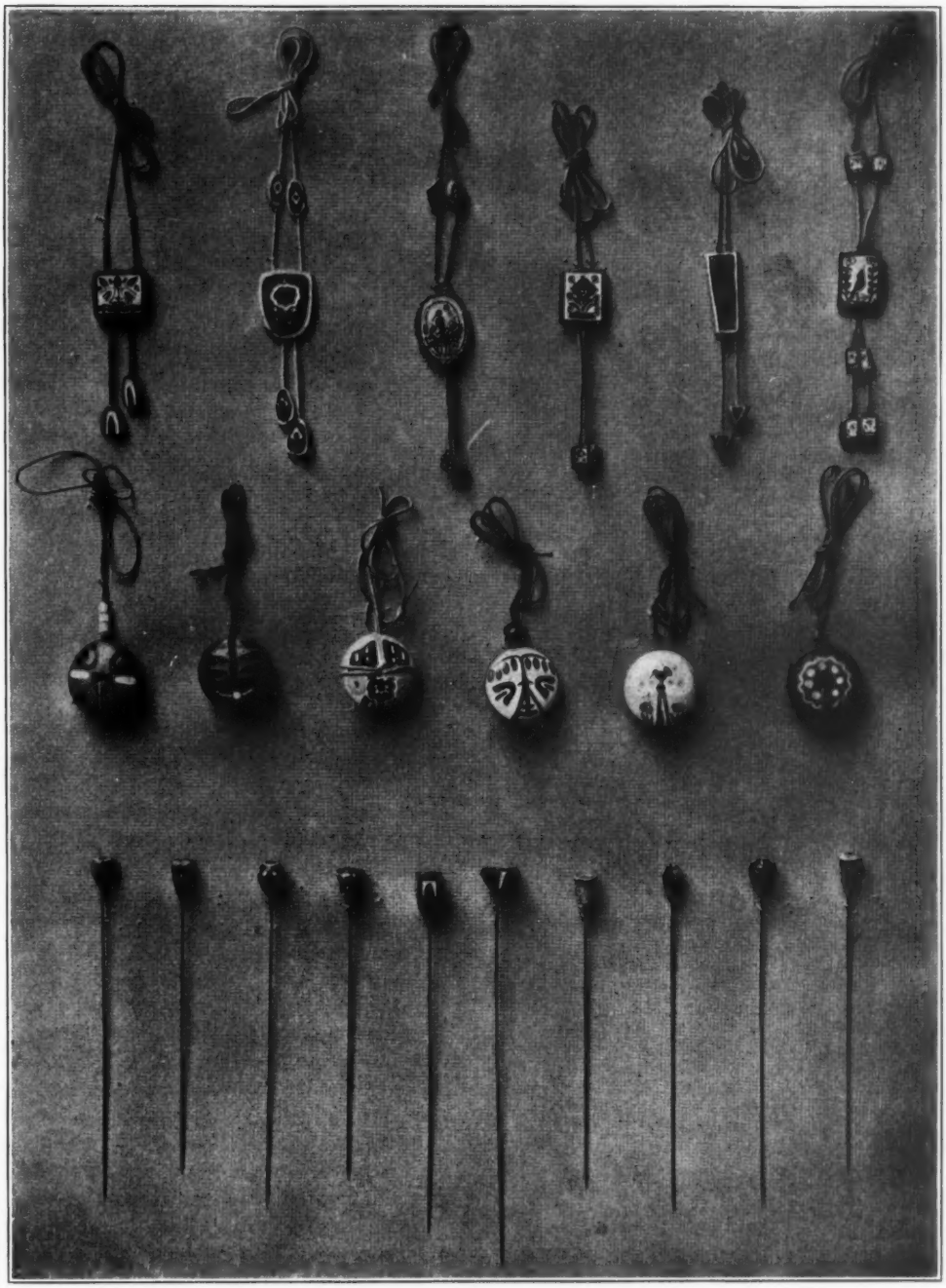


Fig. 6. Upper Row, Lavalieres of Permodello; Middle Row, Curtain Pulls made from Painted Button Molds; Lower Row, Hat Pins with Painted Permodello Heads.

500 "Tumbling Toms" (with parallel bars), made and painted in sixth grades.
2000 Curtain Pulls, made from button molds, painted in seventh grades.
40 Round Top Chestnut Wood Tables, made in manual training department, eighth grades.
50 Waste Paper Baskets, frames made in seventh grade manual training classes; panels made by art classes in same grade.
30 Stationery Boxes, made and painted in seventh grades.
20 Wall Cabinets, made and painted in eighth grades.
30 Book Stalls, made and painted in seventh grades.
30 Automatic Feed Match Holders, made of wood and decorated by sixth grades.
50 Match Box Stands, made of wood and decorated in the sixth grades.
50 Spoon Trays, made and decorated in eighth grades.
30 Serving Trays, made and decorated in the eighth grades.
300 Checker Boards and Checkers, made in sixth grades.
100 Toy Lambs, made of Turkish toweling, pattern given, fourth grades.
100 Toy Dogs, made of Turkish toweling, pattern given, fifth grades.
200 small Wagons made of cigar boxes, painted, fifth grades.
500 Towels, with borders of stitchery, made in sixth grades.

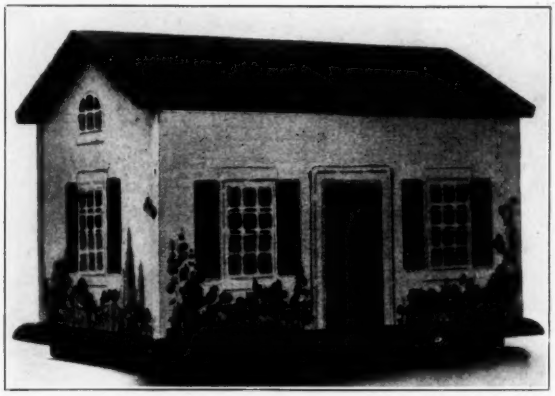


Fig. 4. Exterior of Toy House, made of Wood and Decoratively Painted.

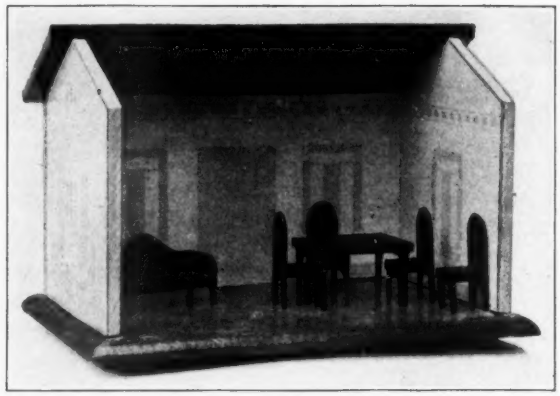


Fig. 5. Interior of Toy House; a Dining Room with Painted Furniture.

60 "Dodo Birds" (motion toy), made and decorated in seventh grades.
1,000 Animal Toys, made of wood, pattern given, painted, fifth grades.
30 Candle Sticks (made of tin cans), made and decorated in the seventh grades.
30 Toy Jinrikshas, made and decorated in the sixth grades.
100 Toy Airships, made and decorated in the seventh grades.
20 Automobiles, made and decorated in the seventh grades.
20 Electric Light Stands, made and decorated in the eighth grades.
40 Stationery Holders, made in the sixth grade, and decorated in the eighth grades.
1,000 "Carryall" Bags (paper), decorated in the sixth grades.
100 School Bags, felt design, made and decorated in the sixth grades.
100 Pin Holders, decorated in sixth grades.
100 Olive Bottles, decorated in the eighth grades.
50 Felt Hats, made in eighth grades.
60 Felt Hand Bags, made in eighth grades.
100 "Noah's Ark" Felt Bags, made in fifth grades.
100 Door Porters (bricks, painted), made in eighth grades.
100 Wooden Waste Paper Baskets, made in sixth grades.
300 Aprons, different patterns, made in girls' vocational school, grades six, seven, and eight.
100 Child's Rompers, made in seventh and eighth grades.
100 Combination Undergarments, made in eighth grades.
100 Night Gowns made in seventh grades.
100 Underwaists and Skirt combined, made in seventh grade.
60 sets Table Mats and Doilies, made in sixth grades.
100 Table Runners and Mats, with Swedish weaving decorations, made in seventh grades.
50 Bird Houses, made and decorated in seventh grades.
2,000 Easter Cards, made in high schools.
24 sets Combination Underwear, Needlecraft decoration, made in high schools.
Large numbers of miscellaneous articles of needlecraft, such as Collars, Bags, Ornaments for Hats and Gowns, Bead Trimmings, etc., made in high schools.
50 Posters announcing the Bazaar, made in high schools.
50 Hand Made Cardboard Boxes, made and decorated in high schools.
60 Toy Houses, made and painted in high schools.
60 Permadello Lavalieres, made and decorated in high schools.
200 Permadello Hat Pins, made and decorated in high schools.
100 Strings Permadello Beads, made in high schools.
200 Strings Paper Beads, made in seventh grades.
15 Tea Carts, made in eighth grades.
60 Child's Suits (slip, knickers, cap), made in seventh grades.
Large numbers of Pasteboard, Tin, Wooden, and Celluloid Boxes and Containers, decorated in sixth, seventh and eighth grades.
The cooking classes will provide quantities of candies, cookies, jellies, preserves, canned fruits and condiments to be packed in boxes and containers made in fifth and sixth grades.

It is proposed to hold this sale in an empty store, during the last week in February. The pupils will in this way receive the benefit of full instruction in the different courses in the first semester, and the bazaar will serve the double purpose of exhibition and sale. The illustrations accompanying this article show a few of the completed projects, detailed descriptions of which will be given in the series at a later date.

Never in the educational history of Newark has such keen interest been displayed by supervisors, teachers and children as is now evinced in the working out of these projects. The school principals also have given wholehearted support to the enterprise. The schoolrooms seem like veritable workshops, the children striving with feverish intensity to accomplish results in which they are vitally interested. Selfishness has been supplanted by generosity. The desire to serve others and in this way to serve their country, is forming a foundation for the highest kind of patriotic training. This is the end and aim of all education.

A DESIRE of knowledge is the natural feeling of mankind; and every human being whose mind is not debauched will be willing to give all that he has to get knowledge.

—*SAMUEL JOHNSON.*

CORRELATION OF PATTERN MAKING AND FOUNDRY PRACTICE IN THE SCHOOL SHOP

Edmund C. Hanley, Department of Pattern Making and Foundry Practice,
Hackley Manual Training School, Muskegon, Mich.

THE most serious problems that the instructor in a pattern making department has to deal with, are creating an interest in the work and impressing upon the mind of the student the principles that are involved in the working out of a series of models.

In most schools where a course in pattern making is offered the subject is taught because of its anticipated importance as a trade, and because of the valuable training it offers in accuracy and skill. One of the greatest drawbacks of many years in pattern making is the lack of correlation of the work with the work of the foundry. It is very true that few schools can spare a room for a complete foundry. This is particularly true in the small communities where space is at a premium and where the schools cannot afford the expense of the necessary equipment. However, there are some schools that fail altogether to realize the importance of closely correlating foundry practice with the work of the pattern shop and do not make clear in the minds of the boys the principles that should be taught thru the construction of models.

I have in mind a class of boys who came under my supervision several years ago in a small western community. For weeks I labored with them; they constructed a fine group of models, and we discussed in class the numerous principles of the work and the obstacles that the pattern maker has to contend with. I drew sketches on the blackboard and placed the cores in the picture, and felt satisfied that the instruction was going along in fine shape. Examination days came and I took advantage of the time, but to my sorrow I found or rather felt, that my weeks of instruction had all been in vain. To fifty per cent of the class, "draft," "core-prints," "cores," "shrinkage," "finish," etc., meant no more than if I had been trying to teach the principles of domestic science to a cabinet shop. I knew if I were to be a successful instructor something more had to be done. I set to work and with some two by fours and a few spikes, constructed in the basement, a moulding bench. We were in a foundry community and supplies of that nature were easily to be had. We were soon equipped and entered upon a new phase of the work. I will never forget the change that came over the class in every way, in their interest and attitude toward their work. The equipment was limited and the boys had to work in pairs. Their turn only came every several days and was waited for with great interest. We made cores and learned how to make the various core mixtures and methods of venting them, while the janitor assisted the boys in baking them. Then we secured a plumber's furnace, a large ladle and fifty pounds of lead from a local plumber. To complete the interest the boys were soon making castings. We secured a bag of plaster paris and constructed "matches," or "follow boards," and also made castings with the plaster. It surely was great sport for the boys,—yes, boys' play,—but it soon impressed upon the boys' mind that which I had been trying for weeks to do, without success.

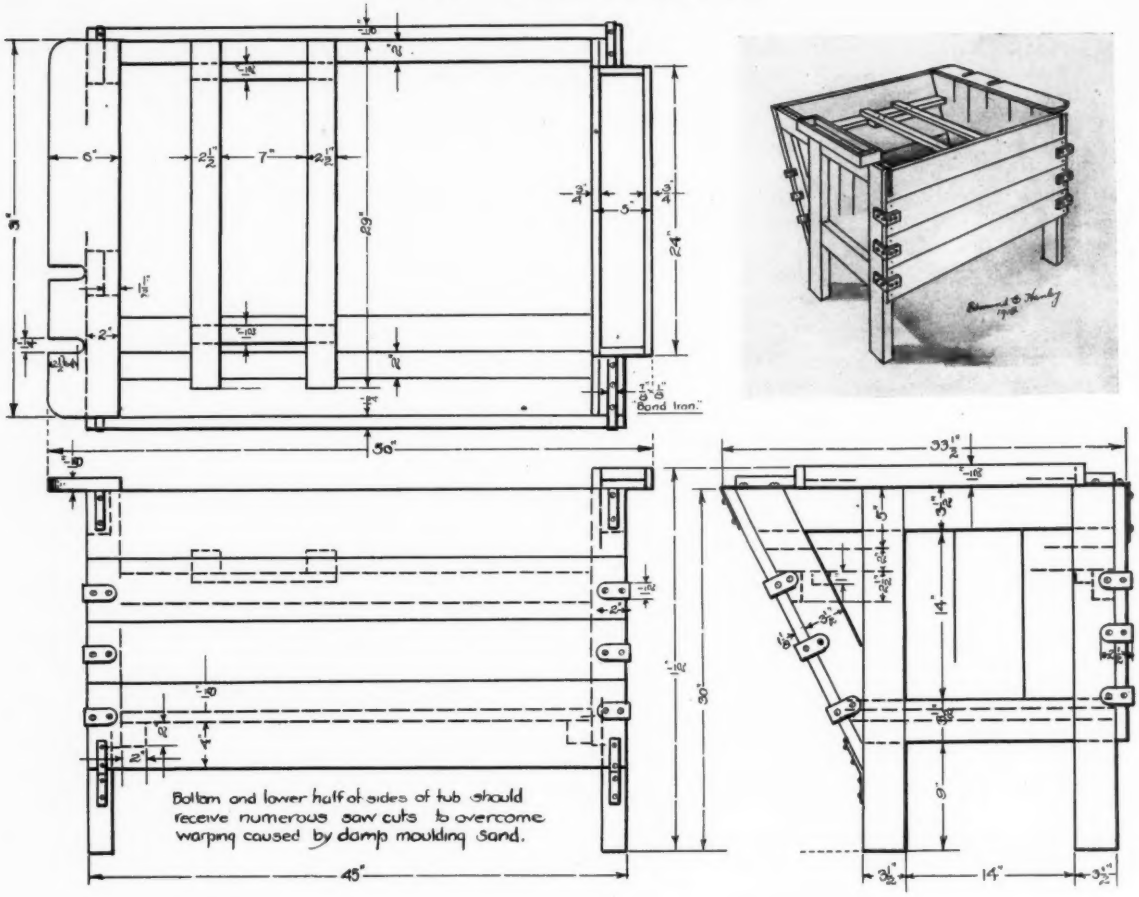
They soon began to observe as never before just what was going on inside the foundries, as they passed their leisure moments looking thru the doors and windows. From day to day they came to me with questions that would puzzle them as they looked on with interest as the moulders worked. When the following September came around I learned that a number of the class had spent their summer working at the foundry. Most of them had worked at the core bench, but there were others who had worked at breaking off gates, counting castings and working in the stock room. It was not the fact that they merely worked in a foundry that pleased me, but the interest they had taken in the work and the power they had developed to observe just what was going on about them.

Today I have in connection with my pattern shop, a well equipped school foundry, but I doubt if my present day students with their fine foundry and elaborate pattern shop equipment appreciate, or are getting out of the work any more, or as much, as did those little fellows with their crude outfit, back in old Wisconsin.

This fall I constructed for demonstration purposes in my pattern shop, a "moulder's tub" which has proved so convenient and practical that I feel a similar one ought to be in every school pattern shop. The bench is easily constructed as will be seen by studying the drawing. Special care should be taken to guard against warping as the material in the bottom part of the tub will be in direct contact with the damp moulding sand. These boards ought to be run over a circular saw several times, that is, numerous saw cuts about an inch apart should cover the boards at the bottom on the inside of the tub. The bottom boards should be left loose to make it easy to remove the sand at any time. The installation of an electric vibrator, which is not absolutely necessary, would make the tub very complete.

A satisfactory tool equipment may be procured at, or thru, a local hardware dealer and should include the following:

Moulder's shovel
14″ riddle $\frac{1}{4}$″ mesh
12″ riddle $\frac{1}{8}$″ mesh
Note: These riddles will fit one into the other.
One or more 12″ snap flasks



A few flask jackets
Medium sized sprinkling can
Two hand rammers about $2\frac{3}{4}$″ D
One pair of bellows
A few various moulder's slicks and a trowel
Vent wire.

Note: A hat pin will do.

A pint of boiled linseed oil for making cores.

In addition have the boys make as an elementary wood turning exercise a sprue pin on the lathe. This should be about 6″ long, tapering from $1\frac{1}{4}$″ at one end to 1″ at the other.

Also have the boys make a few moulding boards 12″x12″ with cleats on one side.

The outfit still lacks a gate cutter. This may be made by cutting a piece of tin about 2x3 inches and folding so that the sides become about a half-inch apart and rounding at the bottom.

Now order in from a local foundry the following:

A barrel of moulding sand
A box of parting sand
A small sack of parting dust.

If you desire to have any of the moulds poured with iron you should also include a small sack of graphite with the latter order. This should be dusted on thru a sack in the mould as a final step before the metal is poured.

If the above instructions are carried out you will have a very efficient little foundry. Small, indeed, but if you have never given your boys a chance at moulding, I would recommend that you start in today. Then the boys and yourself will long to pour real metal.

MEN DO NOT succeed by chance. Chance may put you into a position of power, but if you do not possess capacity you will never hold the place. *STEPHEN GIRARD.*

PORTLAND AND MAGNESITE CEMENT AS A MANUAL ARTS MEDIUM

Edward F. Worst, Supervisor of Elementary Manual Arts, Chicago

THERE was a time when manual training in the grades consisted of a series of models carefully planned by the teacher and mechanically executed by the pupils. Wood was the only medium in which the boy was expected to work. The exercises were often uninteresting, consisting of a series of joints, related to no particular problem but designed to produce skill. The public was led to believe that even in the grades the boy was taught to become a carpenter, a pattern or a cabinet maker.

The up-to-date manual training teacher of today has come to realize that the real object of manual training is not to train mechanics but to develop the boy, rather than to impart skill which in the past was so often made the dominant feature in manual training. Not that the training to acquire skill should be neglected, but it should not be fostered at the expense of the child's broader understanding of nature and nature's laws.

The teacher, too, has come to realize that no set of models executed in wood only can express the elementary manual training idea. He has learned that emphasis should be placed on a variety of materials and a combination of materials which gives a broader view of the subject, "manual training."

Experience derived from handling a variety of materials broadens the boy's horizon and makes it possible for him to appreciate and enjoy the unusual rather than the more common-place problems so often imposed on him.

Even tho his experience in the handling of materials be ever so limited sufficient knowledge is gained for him to quickly discover the various materials in the finished products found in the commercial world, and tho not financially able to become the possessor of many works of art he has at least gained sufficient appreciation and knowledge for the well chosen materials used in the construction of art problems found in the numerous first-class show windows of our large furniture establishments and gift shops to enjoy every one of them.

If this is at all doubted it is only necessary to observe a group of girls or boys at the basket counter in a first-class department store. Their experience in basket-making, even tho limited, makes it possible for them to see more and thoroly enjoy it all than one who has never gained an appreciation for basket materials from having worked on baskets. The display of baskets unconsciously leads them into discussion of materials, colors, arrangement of design and utility of the various shapes.

The same enthusiasm is expressed in a display of pottery, metal, leather, books, etc., all due to experience in handling these materials in their regular periods for handwork in our public schools.

Last but not least may be mentioned the vast fields of unexplored possibilities in Magnesite and Portland Cement. Articles have been written and books published on the subject but none have quite met the needs of the school.

To organize any commercial material so as to meet the needs of the school is no small task. The practical workman and the theorist usually develop and present their plans without having considered the most important factor, the "child." Lack of experience with the working power of children has led them to present problems too difficult. It is with fear and trembling that the writer presents the details of a few attractive and practical problems very simple in their construction.

The problems, so far as possible, should be made individual, as this adds life to any subject.

Magnesite Cement.

Magnesite is a carbonate of magnesia or form of lime stone, which has been calcined by burning, thus eliminating the carbonic acid gas and leaving a pure white powder, or magnesium oxide. It is found in the form of irregular veins in serpentine and other magensium rocks found in the U. S. in Maryland, New Jersey, Massachusetts, New York, California, and Washington. Before the beginning of the war great quantities of magnesite were imported from Europe and because of its superior quality was more generally used.

The manufacture and use of this valuable material is increasing rapidly tho few persons in America have real definite knowledge of its composition; many have experimented and most interesting results have been obtained. This material is so fine in composition that when properly used and colored it may be made to serve the purpose that genuine marble would serve. Its cost is extremely low as compared with even the cheaper of genuine marble and granite. In the commercial world it is used in interior trimming, such as wainscoting, sanitary base, and floor tile; the products are fireproof, highly sanitary, stronger, lighter and less brittle than marble.

Magnesite cement has been used as enamel for concrete blocks, cement and clay brick. While considerable labor and unusual care is required to perfectly apply the enamel the results for certain purposes have been very satisfactory.

Notwithstanding the simplicity of the process of using the various materials in the Magnesite cement work, there are many important details that must be carefully observed or failure will follow. It is the purpose of this article to treat in a practical manner

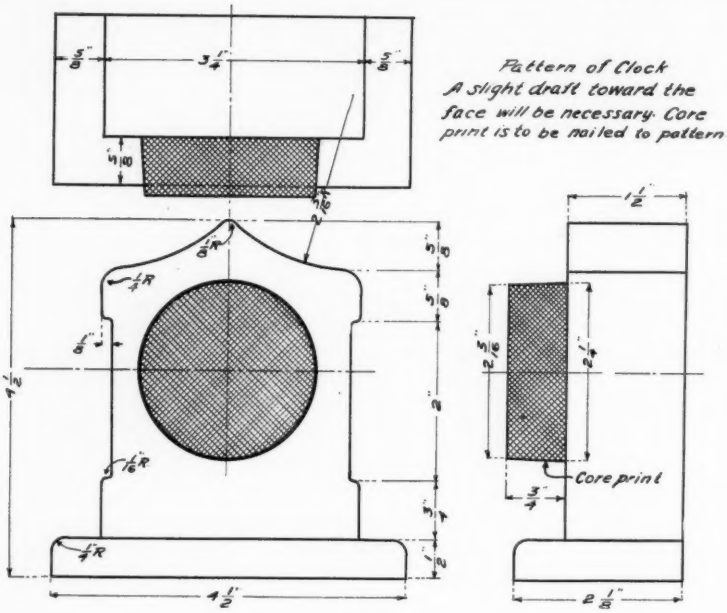


Fig. 1.

each step and furnish formulae for the making of various articles of interest to the boys.

Materials.

The principal materials or ingredients necessary in making articles of magnesite cement are: calcined powdered magnesite, chloride of magnesia, sulphate of magnesia, talc, white sand, silex, and ground quartz, fine sawdust, and asbestos fibers. While all these materials are never required in a single product, each has its place in the casting of various forms.

Magnesite: This material having already been described needs no further explanation. It might be well, however, to mention the fact that Magnesite if left exposed to the air or dampness for any length of time will deteriorate. It should be kept in tight bins or casks to preserve its full strength.

Chloride of Magnesia: This material has the appearance of ice or alum. When exposed to the air it gradually begins to dissolve, but does not deteriorate. Its use and the method of preparation will be described later.

It is the chemical action caused by uniting the magnesite and chloride of magnesia solution that produces the cementing action in all magnesite cement work.

Sulphate of Magnesia: This material is commonly known as epsom salts and may be obtained at any drug store. It is used in small quantities only.

White Talc: This product is well known as powdered soap stone and is used as a filler when making anything having a white background. It adds a smoothness and lustre to the finished articles.

White Sand may easily be procured of almost any dealer in building materials. The sand should not be of too fine a grade, nor as coarse as that used in concrete work and should be absolutely clean.

Molds.

Fig. 1 shows the model used in making the following described mold.

Molds are usually made of wood, plaster of paris or glue. Since the clock forms emphasized in this article are of irregular forms the best kind of mold to use is that of glue.

The Glue Mold—Because of the fact that glue molds are flexible, they lend themselves in casting forms, irregular in outline, and embodying heavy relief work in which more or less undercutting must occur. In the case of wood and plaster of paris the mold is often made in a number of pieces while the flexibility of glue makes it possible to construct the mold in one piece. In such a mold the cast form may be easily removed, while the magnesite or concrete are still in an unhardened state with little fear of injuring the more complicated parts. There may be some objection to the glue mold because of the limited number of casts which may be made.

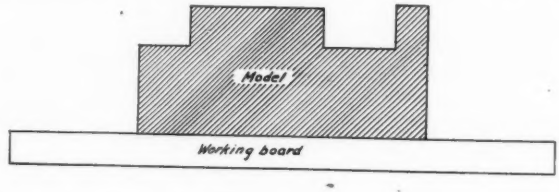
Molds made of wood or plaster of paris may be used any number of times while the mold made of glue is limited to about six casts.

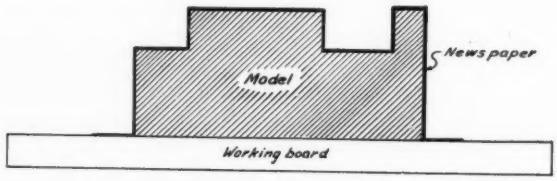
Making a Glue Mold—The essentials in making a one-piece glue mold are the working board, the model, modeling clay, plaster of paris, and paraffine oil.

First, the model to be reproduced is fastened to the working board by means of shellac on the back of the model, or it may be held in place by a screw put in from the underside of the working board. The placing is shown in the cross-sectional drawing, Fig. 2.

With a soft lead pencil mark around the model, thus leaving its outline on the working board.

Second, the model, when placed, is completely covered by a dampened newspaper following the general outline of the model as shown in Fig. 3.





(Above) Fig. 2. First step—model placed on working board.
(Below) Fig. 3. Second step—model covered with newspaper.

The dampened newspaper is not absolutely necessary as the modeling clay may be placed directly on the model itself. The model should be given a coat of paraffine oil before placing the clay.

Third, the modeling clay is rolled out into a sheet from one-half to three-quarters inch in thickness. This may be done by using a rolling pin or by using a piece of broom handle. The model is completely covered with the clay as shown in Fig. 4, care being exercised in keeping the clay of an even thickness.

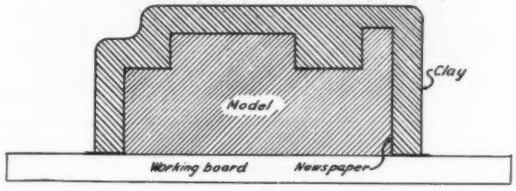
The clay is next covered with plaster of paris.

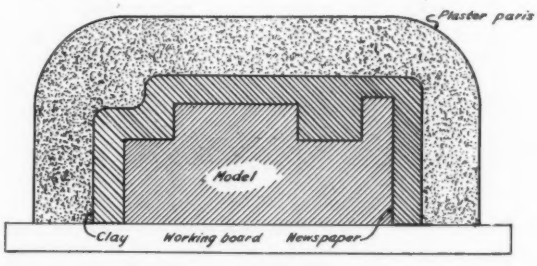
Fourth, the entire surface of the clay must be well covered with a coat of paraffine oil to prevent the plaster of paris from sticking to it. It is then covered with a plaster of paris case of one-half to one inch in thickness. In case of large pieces the case must be somewhat thicker.

Mixing of Plaster of Paris.

Use a tin receptacle for the mixing of plaster of paris. Place the desired amount of water in a tin pail and shake plaster into it until the plaster comes to the surface. It is then well stirred; this mixture is then scooped up with the hand and thrown on to the clay until the sides are completely covered to the thickness above mentioned. It will be necessary to work quickly to prevent the plaster from becoming hard on the tin. If the plaster is allowed to harden before being used it must be thrown away and another mixture made. Fig. 5 shows the plaster case over the clay. With a soft lead pencil or sharp tool mark around the outer edges of the plaster cast, thus leaving its outline on the working board.

Another Way of Making a Case—Fig. 6 shows a cross sectional drawing of the model covered with clay placed on the board and surrounded by a flask which is nothing more than a simple frame placed on the working board, into which the model is placed.





(Above) Fig. 4. Third step—model showing clay placed over newspaper.
(Below) Fig. 5. Fourth step—model showing plaster paris over clay. (First method.)

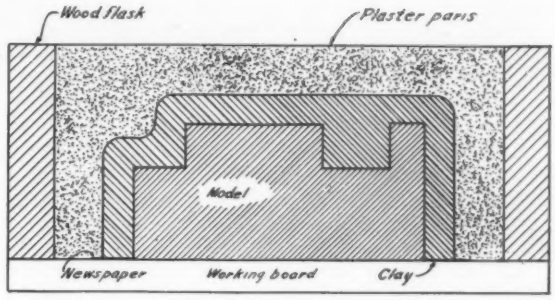


Fig. 6. Fourth step—model showing plaster paris over clay. (Second method.)

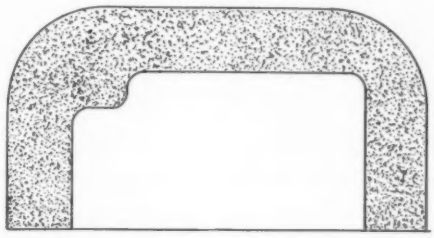


Fig. 7. Cross section of plaster case with model and clay removed.

The surface of the clay and inner surfaces of the flask are well coated with paraffine oil. The plaster is mixed as above described and poured into the flask instead of being scooped up with the hand and thrown on. This method is more simple especially for the one just beginning.

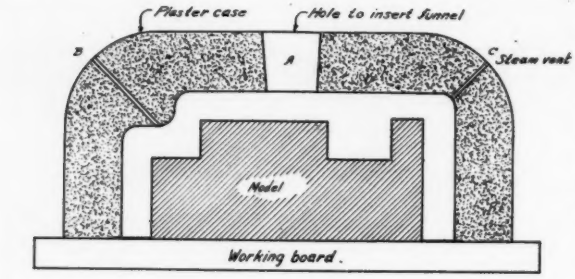
Removing the Model—Mark the outline of the cast before removing it from the board. In about one-half hour the plaster of paris has sufficiently hardened to remove the model. A simple test as to the readiness of the removal of the case is made by laying the hand on the plaster. If it is warm it is fairly certain that the cast is ready for removal. The case is loosened and turned bottom upward. The model being covered with clay is easily removed and the clay having been well oiled is freed from the plaster of paris.

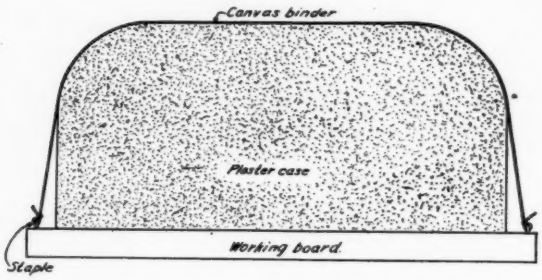
The Case.

Fig. 7 shows the case, the model, the clay and paper having been removed. The model is now carefully cleaned and well shellaced. After the shellac has thoroly hardened the glue mold is ready to be made.

The model is again placed on the working board. It will be remembered that the outline of the model was left on the board in order that it might again be returned to its original position on the board.

Fig. 8 shows the case placed over the model and in the same position as it was cast. The outline left on the board will aid in getting it exactly placed. Before placing the case a hole about one inch in diameter is made in it at A. It is thru this hole that the glue is poured. Several other smaller holes are made in the case about one-eighth inch in diameter as shown at "B" and "C." These smaller holes are provided in the case to allow the air to escape while





(Above) Fig. 8. Fifth step—model and plaster case in place, ready to pour glue. (Below) Fig. 9. Method of holding case to working board while glue is poured.

the glue is being poured. Before placing the case in its original position its inner surface must be thoroly oiled.

The surface of the model must also be oiled to prevent the glue from sticking. It will now be observed that instead of a layer of clay and newspaper between the model and the inner surface of the case there is a vacant space into which the glue is to be poured.

Glue—White glue is the best in making glue molds. It may be purchased at any first-class paint store. It is the kind of glue used by expert plasterers in making molds. Owing to present conditions the price per pound is somewhat higher than in the past.

Preparation of Glue.

It is of the greatest importance that the glue used in the mold should be of a uniform thickness in order to produce the best results. In order to bring this about it should be soaked for about fifteen minutes. During this period of soaking considerable water is absorbed which causes the glue to swell. The glue is now placed in a double boiler and heat applied. If a regular double boiler is not conveniently had one may be made by taking a tin pan and a tin pail. Water is placed in the pan, a block of wood is placed in the bottom of the pan and the pail placed on it. Heat is now applied and the glue which is placed in the pail is allowed to melt slowly until it is of the consistency of cream.

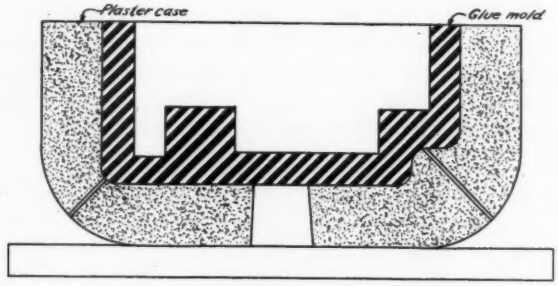
Pouring the Glue—After the model and case have been placed in their original position on the working board as shown in Fig. 8, a strap (Fig. 9) is tied across to keep the case from rising as the glue is poured, the glue is ready to be poured. If necessary a funnel may be placed in the opening marked A, Fig. 8, and the glue poured thru it or the glue may be poured directly thru the hole, filling the space formerly occupied by the clay and newspaper.

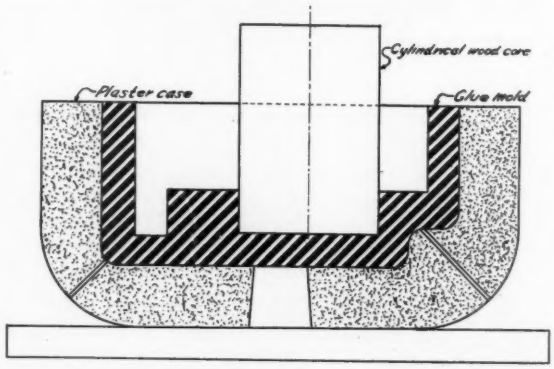
As the glue fills the mold it will run out of the air holes "b" and "c", Fig. 8. When this happens the holes may be stopped up with a small piece of modeling clay. The pouring continues until the glue begins to fill the hole marked "A," Fig. 8. The glue is allowed to harden for ten or. twelve hours before removing the case.

To Remove the Case—First cut the glue away from the hole thru which the glue was poured. Next remove the strap which held the case on the working board, Fig. 9. Sometimes it is necessary to use a small amount of modeling clay at the base of the case around the outside to prevent the glue from leaking out. The case with all its contents is removed from the board and the glue mold which still contains the model is forced out of the case. To aid in removing the mold force the fingers into the opening thru which the glue was poured. If the inner surface of the case is well oiled before pouring the glue there will be no difficulty in removing the glue mold. The model having been well oiled may be easily removed from the glue. Fig. 10 shows the model removed and the glue mold in the case.

Care of Glue Mold.

Before using the glue mold for casting purposes its entire inner surface must be made waterproof. This is done by painting the surface with a solution of alum water. Before alum water can be applied the oil must be removed from the glue mold. This is accomplished by the use of talcum powder. Sprinkle





(Above) Fig. 10. Sixth step—glue mold in place, with model removed. (Below) Fig. 11. Seventh step—model removed, cylindrical core in place ready to pour magnesite.

the talcum powder into the mold and then wipe it out thoroly. This removes the oil, leaving a free, clean surface. At least three coats of alum water are necessary, letting each wash dry before applying the next. Another most excellent way of making the mold waterproof is to use a couple of coats of a fine grade of varnish. It is well to strain the varnish thru a piece of cheese cloth.

Before making a cast the inner surface of the glue mold must be well coated with a light oil; paraffine oil is good.

Assembling Parts—In preparation to cast a piece in magnesite or cement, place the case on the working board as shown in Fig. 11.

The glue mold, which has been given several washes of alum solution to make it water proof, is dropped into the case, Fig. 11. It readily finds its place in the plaster case. After oiling the inner surface of the glue mold and the placing of the core, the mold is ready to receive the magnesite or cement mixture. Molds should be oiled and in readiness before the mixture is prepared. The case is simply a cylinder of wood placed so that an opening may be left in the finished clock standard into which the clock may be placed as shown in the finished clock, Fig. 12.

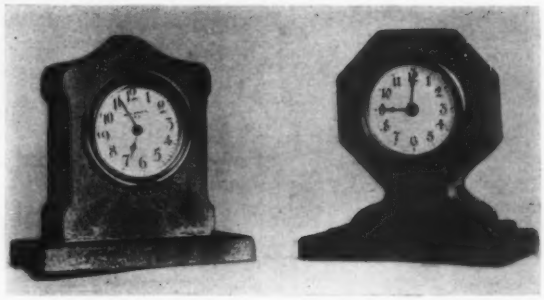


Fig. 12. Finished Clocks.

Formula.

For casting small articles like the clock forms, the following formula will be found efficient for either plain or variegated colors.

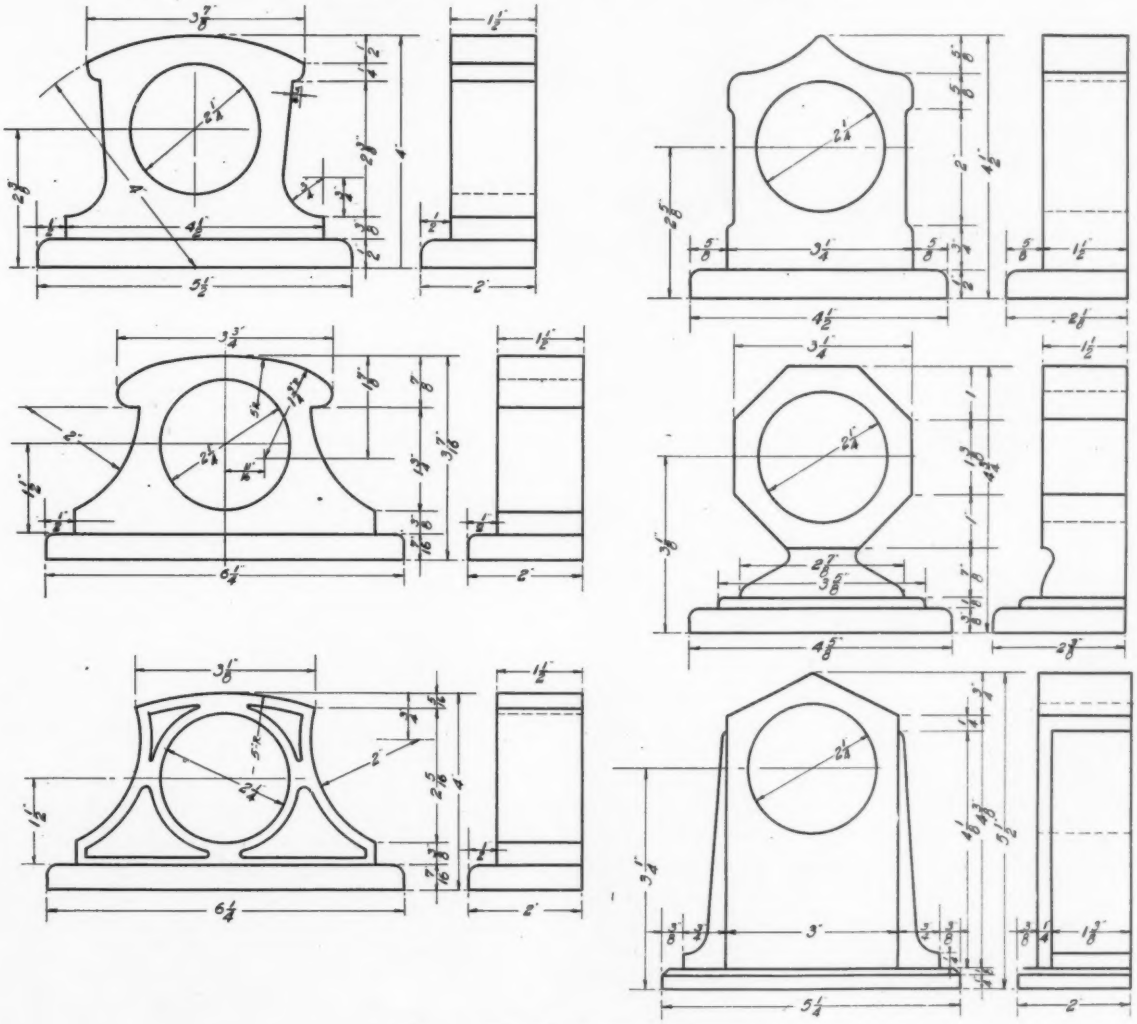


FIG. 13. DETAILS OF CLOCK DESIGNS.

First Step—To 5 lbs. of powdered magnesite add 2 lbs. white talc and 2 quarts of fine sawdust; mix these dry materials thoroly. If a plain all-over color is desired, the dry pigment must be added at this time and thoroly mixed with the other ingredients before mixing with the liquids. When marble effects are desired, the dry coloring matter is placed in a small stone mortar with powdered magnesite and thoroly ground with the pestle. The proportion is usually 2 parts of magnesite and 1 part of color. Mix with it sufficient liquid, the same as was used in the composition, to bring the mixture to a creamy state.

The original mixture, which is without coloring matter, is poured into a shallow bread pan. With a common table knife the color in the mortar is scooped up on the blade. The knife is now cut thru the mixture in the bread pan, carrying with it streaks of color. By jarring the bread pan, the color spreads just a little. The mixture is now poured from the pan into the mould.

When very small articles are to be colored in this way, it is well to dip the mixture from the bread pan to the old with a large table spoon. This produces a finer veining.

By experimenting marvelous results may be had.

Second Step: To 5 parts of chloride of magnesia solution, density 25°, add one-half part sulphate of magnesia solution (epsom salts), density 15°. It is well to strain this mixture before using with the powder. The above solution is now mixed with the dry mixture, to the consistency of thick cream or pancake batter. Mix thoroly with the hand or a paddle.

If the chloride of magnesia is chopped into small pieces, it will dissolve much quicker. It has been found that rain water gives better results than spring water, which often contains an excess of lime, iron or other mineral that is injurious to the composition.

The Hydrometer—The density of the solution above mentioned is tested by means of a Beaume hydrometer. It is a glass instrument similar to a thermometer and may be obtained thru any druggist. This instrument when placed in clear water will register "0"; as the chloride dissolves the hydrometer will register the density of the solution. The same is true of the epsom salts. It is well to keep on hand a quantity of the above named solutions. If the density is too high, enough water may be added to bring it to the required density.

Dry Colors.

When selecting colors to be used in magnesite and Portland cement, it is of the greatest importance that only such colors are used that are "lime proof." Aniline or vegetable coloring matter are almost sure to fade and should never be used. The following table shows a list of dry colors.

- Germantown lampblack, Carbon black, Black oxide of manganese, Black oxide of copper } Black or gray
- Ultramarine blue, Oxide of cobalt } Blue
- Yellow ocher, Chromate of lead } Yellow.
- Chrome oxide of copper—Light green.
- Carbonate of copper—Dark green.
- Red oxide of iron—Brownish-red to dull brick red.
- Mineral turkey red—Bright red to vermilion.
- Metallic brown oxide—Brown to reddish brown.
- Burnt umber—Brown.

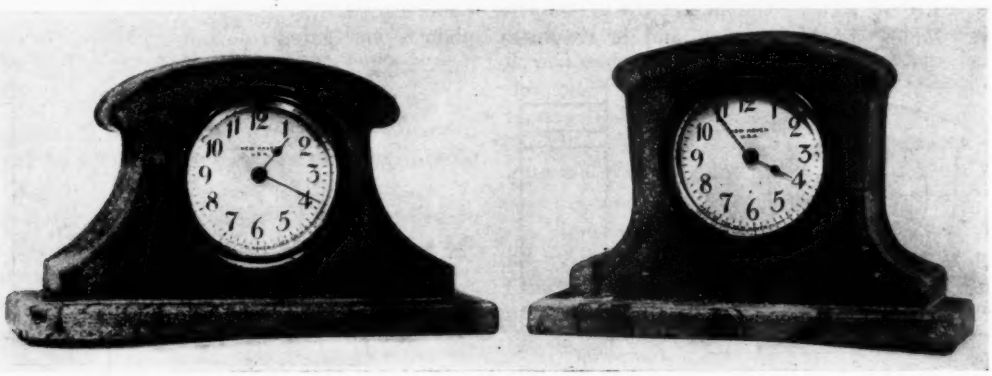


FIG. 14. FINISHED CLOCK FORMS.

The amount of coloring matter to use depends upon the depth or shade of the color desired. A variety of colors may be obtained by using several colors in the same mixture.

The best dry powdered colors often contain lumps that cause imperfections to appear on completed work. It is well to have on hand a small stone mortar and pestle in which the colors may be thoroly ground before being added to the other dry ingredients. It is also well to have on hand a small sieve by which lumps may be eliminated.

Third Step: After the several dry ingredients have been thoroly mixed with the liquid the entire plastic material may be put thru a fine sieve, using

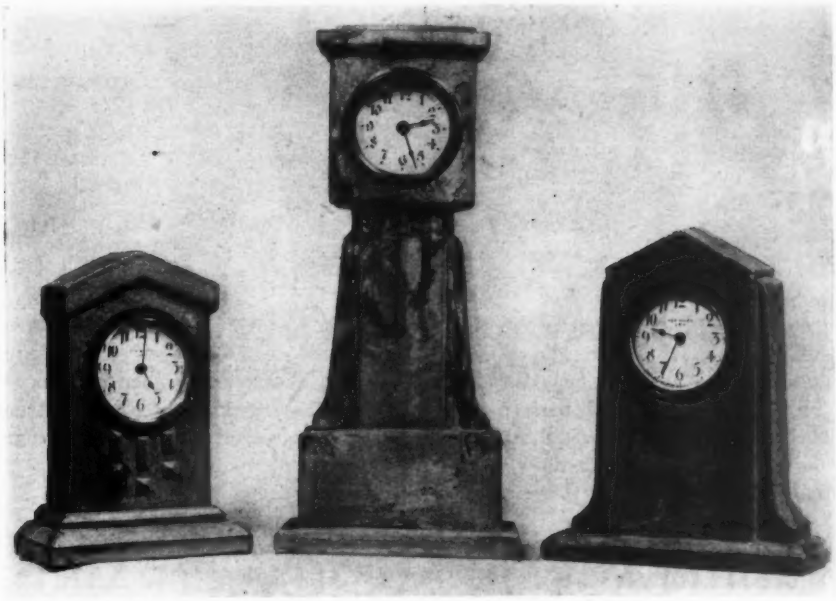


FIG. 15. FINISHED CLOCK FORMS.

a small brush or wooden trowel to force the mixture thru the sieve. This eliminates any lumps that might cause spots on the surface of the finished products.

Fourth Step: The mold is now quickly filled with the above mixture. Delay must be avoided. If setting begins before pouring the results are apt to be imperfect. By means of a brush, work the mixture around the edges and corners of the mold. It is well to tap the filled mold gently to remove air bubbles from the mixture.

It requires from 6 to 8 hours for the magnesite cement to set. The core, however, may be removed in four or five hours after pouring.

The amounts used in the above mixture will make a block one foot long, one foot wide, and one and one-half inches in thickness.

Portland Cement.

If Portland cement is used, the mixture should be composed of one part of Portland cement to 2 or 3 parts of sand. Enough water should be added to make the mixture about of the consistency of cream. The mold is filled flush with the top. Jar the mold up and down a few times to force out any air. It requires about twelve hours for the mixture to harden.

To remove the cast, the case is turned over, and the glue mold drops out. By taking hold of the glue mold and bending it up, the cement or magnesite cast will drop out.

To Finish Cement: A very pleasing rubbed surface may be had by rubbing the surfaces of the cast with a brick and sand, natural stone, emery, or carborundum. This must be done at the time the cast is taken from the mold.

By placing the finished form in a pail of water for several days it becomes very hard.

To Finish Magnesite.

After the cast is removed from the mold, a sort of bloom appears on the glass surface. This may be removed in from 24 to 36 hours by washing with tepid

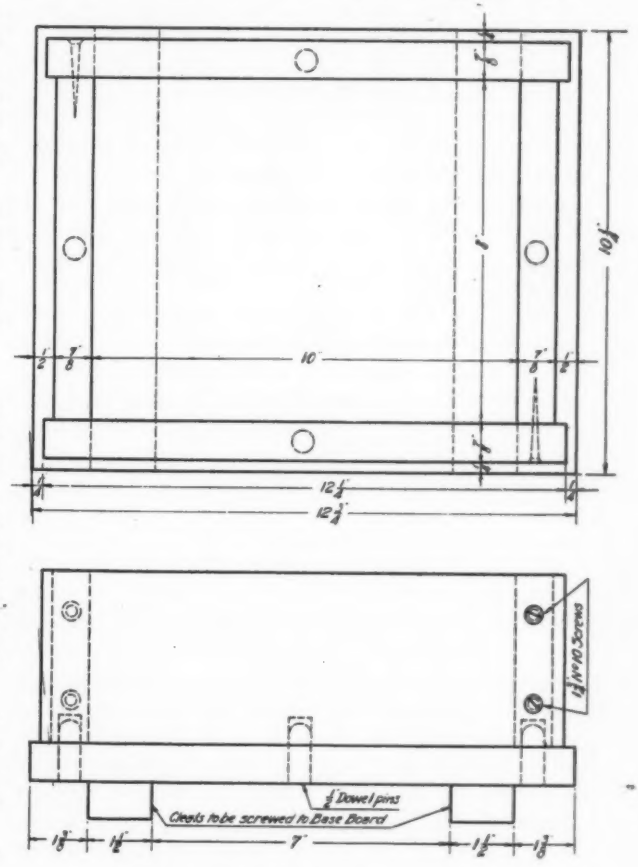
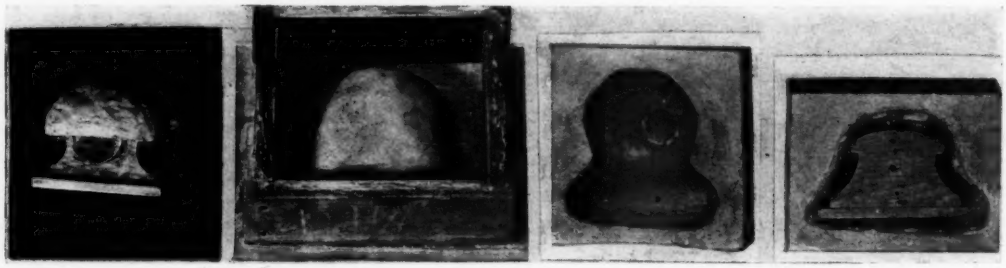


Fig. 16. Moulding Flasks with Removable Sides.



A B C D

Fig. 17. A shows model partially covered with clay; B shows model covered with clay and ready to be covered with plaster of paris; C shows plaster case with clay model removed; D shows model in case surrounded by glue.

water and rubbing dry with a piece of cheese cloth. The surface may be thoroly rubbed with pumice stone and then given a coat of linseed oil, or warm floor wax may be used. In about ten days or two weeks the cast may be given a coat or two of linseed oil varnish.

Fig. 13 shows a number of forms usable for clocks. Each will be found simple in construction and lends itself to successful glue mold making. As the work advances, pupils should be taught the wood and plaster-of-paris mold making.

Figs. 14 and 15 show a number of finished clocks.

CAMOUFLAGE IN MANUAL TRAINING

Frederick A. Adams, Northampton, Mass.

THE first question which comes up in a person's mind is, "How can manual training be camouflaged?" A definition of camouflage heard recently was that camouflage was making something appear like what it "aint."

There have been and, I regret to say, still are various methods used in camouflaging manual training. The cause of these are many of them self-evident, such as poor teachers, lack of initiative power and lack of progressiveness. I think we are safe in saying that the greatest number of cases may be traced to poor teachers who have had insufficient training or who are too lazy to use advantageously what training they have had.

To this same class might be added those teachers who think today exactly as they did ten, twenty or thirty years ago and who want to give the boys of the present generation the same training that was given in those past years. We all know well enough what manual training amounted to thirty years ago. Times are changing, and methods and courses in education must change in proportion to the demand which the individual must meet.

How are we to recognize this camouflage in manual training? In most cases I do not believe a microscope will be needed to discover it, but we may need a ten-inch gun to destroy it after discovery.

The most widely used method is that of having a most elaborate course of study and a lot of statistics taken from various sources, together with lovely pictures showing ideal conditions (which would probably cause heart failure to those in charge should they materialize) printed in the form of a nice little booklet. This is really "paper work" in manual training.

Another way of using this protective art, one, however, which is more strenuous physically for the instructor, is where the instructor does from 75 per cent upwards of the boys' work. He may, perhaps, select a small number of his best workmen and bend every effort to make their visible product excellent. This work is then displayed to the public as a fair example of what the boys are doing.

Surely many boys are overlooked by this method, and usually they are the ones who need the greatest help. How many cases there are where a boy who does not do quite as well as he might is put on some job from which he learns absolutely nothing. I make allowances for the few cases where this is justified.

Surely it is wise to give the bright boy who has a leaning toward the work all the help possible, but not by cheating the other fellow who needs the help still more. The first boy will, in nine cases out of ten, get what he needs any how, while the slower boy may become discouraged after a while and the chance to lead him ahead is lost.

In any class of twenty boys there are usually three or four who do exceptionally good work. Take a teacher who has eight or ten classes and it is not at all hard to make quite a showing by centering all his efforts around these boys. Is this fair to the majority? Do not throw down the teacher who has not a lot of work to show. The results may not be visible at first, but time will tell. A study of the efficiency and the industry of the boys after they leave school is worth ten exhibitions.

I have faith in our boys, and I do want to see them get a square deal. They must not be elated by false praise; this is as bad as poor work.

Manual training is too serious a work for any

person to use as a means to line his own nest. Let every teacher earn all he can, but he must be delivering the goods. Any person who wishes to earn a large salary without work or responsibility will have to go into some other line of work, if he can find it.

After all, would not the time and energy spent in covering up what is carelessly done, if directed wisely and carefully in the right direction, be a great factor in improving conditions as they sometimes exist?

This is not the time for any teacher to waste time or opportunity. The country will be looking to the boys of today to carry on the industrial fight in the years to come. Any person who is in a position to help train these boys in any way should feel it his duty to train them as carefully and as thoroly as possible. Anyone who is not using his equipment to the greatest advantage now is not doing his duty.

Every manual training teacher should take a mental inventory of himself. He will then know whether or not he is a round peg in a square hole. And after taking this inventory, if he is found wanting, he will be doing no more than his duty to find a new job doing different work. This is not the time to let manual training suffer from poor instructors. It would be better to give up the work in those places where it cannot be done under the direction of a capable man, than to do it in a poor way. Bad habits are harder to change than no habits at all.

Lettering Essentials for the Commercial Design Student

Elizabeth Weiffenbach, Buffalo, N Y.

(First Article)

THE ability to letter is a most important requirement of the commercial designer. Modern advertising has been improving in good taste and effectiveness, and a great deal of this is due to the use of good lettering. It is a difficult art to master, but as there is more or less of it done in connection with all classes of commercial drawing it is quite obvious that it is a necessary part of the training of the artist.

Good lettering depends on several things: First, selection of the style of lettering to be used in design; second, good letter construction; third, spacing and legibility; fourth, a knowledge of design principles.

It is hard to decide which of these is most important, as they should be equally so. The average commercial design in which lettering is used, is generally lacking in the first and last—incongruous lettering and not much design. Study and practice along the lines laid down in this article should tend to give a well grounded conception of lettering as a whole. An acquaintance with many types of letters is highly important, altho there is need to draw but a few styles. All the principles of spacing, proportion, design and construction may be learned from the single stroke Roman. To cultivate good judgment in the selection of the type of letter to be used, requires practice in lettering, observation, and common sense.

Material.

At first only a ruler, medium pencil, soft eraser, sharp knife, and ordinary drawing paper are necessary. Later on as the work progresses, add a drawing board, instruments, T-square, triangles, a bottle of black drawing ink, several good writing pens of various sizes, a good quality of smooth white paper or Bristol board, thumb-tacks, a small sable brush, an erasing shield, an ink eraser, a tube of chinese white, and a rag to keep pens clean.

General Directions.

For the instructor—There is no better way to teach a problem in lettering than for the instructor to draw it first. Nine times out of ten, the pupil is asked to attempt too much, and nothing can be of greater value and inspiration than the teacher's own drawing.

Good examples of lettering, as used in commercial design, should be on hand and will serve to arouse interest as well as to form taste and add to the student's knowledge.

The teacher should remember that lettering is slow work and should aim for careful drawing and design rather than quantity of work. It is just as well not to study lettering for too long a stretch. Vary it with use in designs which require color.

About twenty weeks of lettering spread over two years of commercial design along the lines to be suggested form a sound foundation of lettering and its application in designs.

For the pupil—Always sketch in any lettering problem lightly with a medium pencil. Do not use one which is too hard or too soft. The first makes grooves in the paper, and the second soils it.

Sketch the whole design very lightly without using a ruler. After a satisfactory arrangement has been reached measure and rule guide lines at the top and bottom of each line of lettering. Draw each letter more carefully and study spacing between letters and words.

Erase all unnecessary lines and finish in pencil with a firm pressure and a medium point,—not too sharp nor too broad.

If the drawing is to be finished in ink use a ball pointed pen for single line lettering, or a common pen for outlining broader lettering, which requires filling in with a soft brush.

In very careful work as in the Roman where the

thickness of the stem, hair lines, etc., is of such great importance, it is a good idea to make a double tracing and second, and second and third. One operation will do for two drawings. Experiment with one to see if

FIG. 1. SINGLE STROKE ROMAN.

from the original pencil drawing. To do that pin the drawing down to a board with two sheets of paper under it and place carbon paper between the first proportions are good, etc. It is good practice to fill in both tracings. The second will probably be better than the first.

Fig. 2.

The student should realize from the very outset that lettering is a very definite part of the study of design. It is not something which is to be put into empty spaces after the rest of the design is done. Lettering should be considered a definite spot or group of spots and the placing of these masses is quite as important as the arrangement of the rest of the design.

Another thing to think about from the very beginning is that the type and size of lettering used must harmonize with the style of the design and the thing to be advertised. It would not do, for example, to advertise an iron foundry's products with a French script letter. Even if it were drawn large it would not do, as the script letter gives the impression of

Fig. 4.

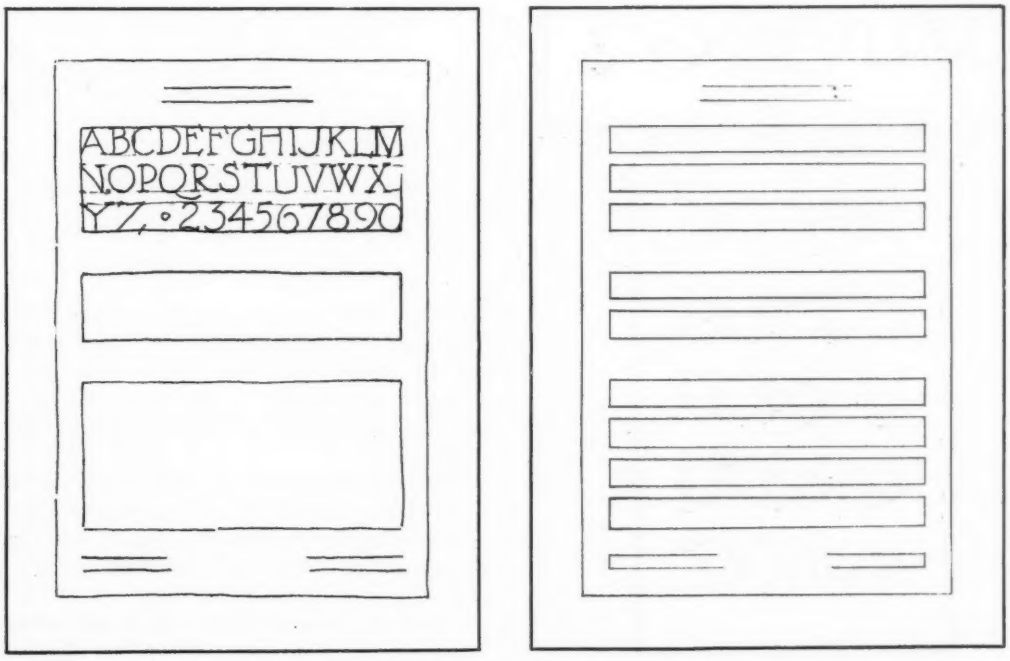


Fig. 3. Layout for Fig. 4.

Fig. 5.

HELEN C JAEGER

Fig. 6.

delicacy and refinement. Iron requires a bold type of letter.

Single Stroke Roman.

Practically all of the fundamentals of good letter formation may be learned from the Classic Roman reduced to single line. It saves the pupil much time and effort in the drawing of letters, in spacing and in learning how to design. Besides that, it is a really useful and beautiful letter to know.

Fig. 1 contains a great deal of information which should be carefully studied, and copied. The student's attention is called to the shapes of the capitals and their characteristic widths; the names of the various parts of letters, such as stem, serif, etc.; the lower-case or small letters; the names of parts of these and guide lines used; the variety of shapes of the letters E, M, W, etc., in both caps and lower case; the round,

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Fig. 7.

extended and condensed forms of the letters; the ampersand ("and" sign); the round dot which is used between words; the shape of the whole panel of lettering in its relation to the page and the margin; the spacing between groups of lettering; the size of letters, etc.

Several lessons can be taken from this plate, the first being a copy of the capitals; the second, an exercise showing the names of the guide lines and parts of capitals and lower case; the third lesson might be the lower-case alphabet alone.

Optical illusion in lettering is an obvious fact. For example, in the letter H the cross bar should be placed somewhat above the center. If drawn exactly in the center the upper half of the letter appears larger.

The letters B, E, F, K, P, R, S, X, and Y are other letters which appear more natural with the upper parts smaller. P and R very often are drawn with the lobes larger than half the height of the letter. Lately there has been a tendency to use the cross bar of the E below the center. This is a fad and no doubt has its uses for the present.

Another illusion is that round and sharp pointed letters appear shorter than other letters in the same line. Therefore to counteract this wrong impression which the eye gives, it is necessary to draw the letters A, C, G, O, Q, S, V, W, and the pointed part of N a trifle higher or lower than the guide lines. Do not exaggerate in this particular, as that is as bad as not paying any attention to it at all.

These facts about optical illusion apply more particularly to the Roman letters than to any other style.

It should be remembered that while each letter is an emphatic spot on the background, that the space which shows thru is just as important. Letters vary in width, but the spaces between should be approximately the same. Fig. 2 shows in a simple way right and wrong spacing between letters in a word, and spaces between words.

In words it is practically impossible to get even spacing between letters by the use of the ruler. To give the impression of equal spacing, it is often necessary to place one letter partly under another. For example, in the letters P, A, C, (Fig. 2). The A is partly under P and C. The spacing between letters in a word is solely a matter of eye measurement. In this very fact lies the chief difference between printing and hand work. The printed type cannot possibly be as beautifully spaced in a design as the lettering of a master craftsman because each piece of type allows for a uniform space between it and the next letter, whereas in hand lettering the spaces vary.

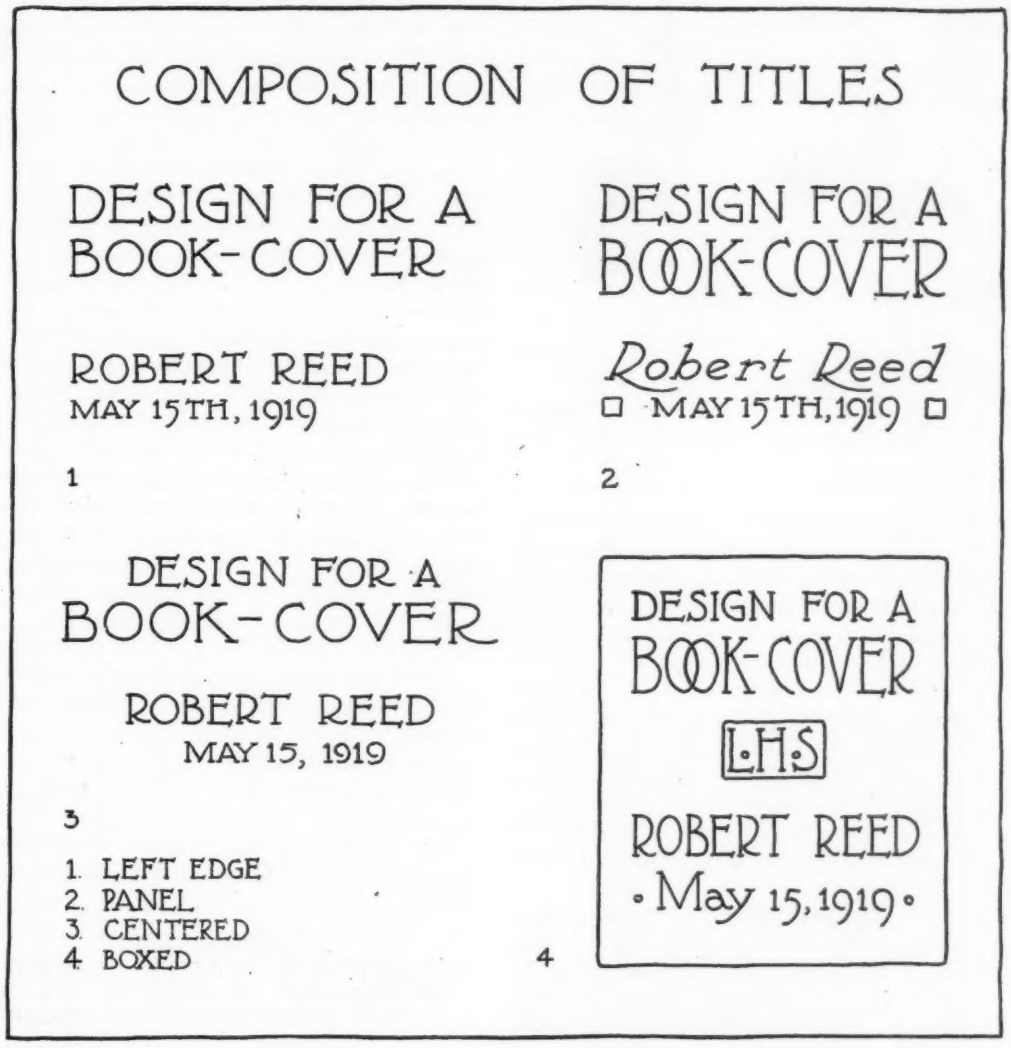


Fig. 9.

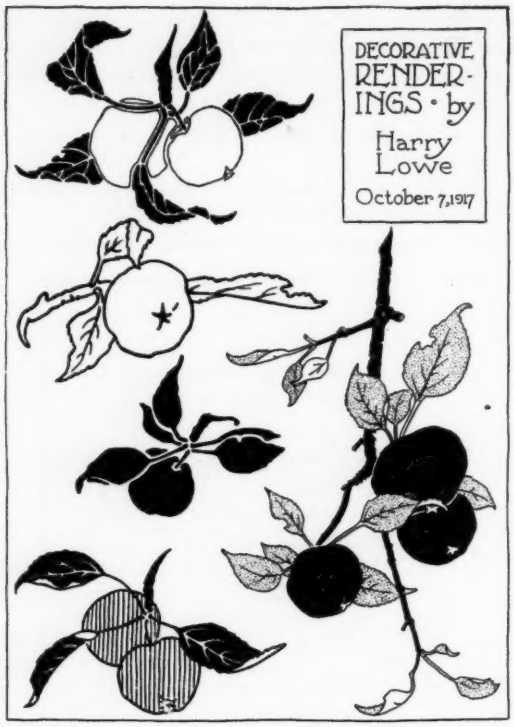


Fig. 8. An Appropriate Use of a Single Line Title.

It is often necessary to make a space between letters extra wide. If the letter I occurs between K and K, for example, the space should then be made larger than if it came between C and S, which on account of their shapes naturally leave much space at the top and bottom. Between words the space should be at least the width of one round letter, but not more than one and a half. Between sentences the space should be about one and a half letters. Between lines of lettering the spaces vary, but one line should never touch another, neither should it be too far away from the one above or below. Lettering must not project into margins as a rule, and must not touch drawn margin lines.

In the general suggestions given to the student at the beginning of this chapter, it will be noted that a light freehand sketch was to be made first (Fig. 3). After that straighten up the lines with the ruler and proceed to draw carefully. This tentative sketch is called a layout. Some emphasis should be placed on this word because it is a term much used in commercial design.

Fig. 3 is a layout for Fig. 4. This is a problem in drawing the single line Roman letter in three forms, normal or round, extended or expanded, condensed or compressed. Each group with numerals to fill in, forms a rectangle. There is a margin within a margin and the lettering as a whole forms a panel. Each group of letters has been considered as a mass. In lettering of this sort it is well to use a center line for balancing and for spacing if the lettering falls short of the inside margin.

Fig. 5 shows the lower-case letters grouped and spaced in another arrangement, but carrying out the same idea. Note particularly that the circle of the round letters b, c, d, e, o, p, q become elliptical in the condensed and extended forms. Figs. 6 and 7 are exercises along this line done by high school students.

There are so many design problems in which lettering is the chief motive, that the selection should not prove difficult. The beginner may well start with a simple label design to place on one of his drawings (Fig. 8). Fig. 9 shows four ways of doing the same title. The following principles of design are brought out in this drawing: (a) *Emphasis* is laid on the name of the design; the pupil's name is next important, and then the date. (b) The spacing up and down and across has been considered carefully. It shows *variety*, and there are no spaces too wide nor too narrow. The spaces between letters are good. (c) The *proportion* of the size of the letters to the size of the panel and that of the lettering to the spaces left is satisfactory. (d) There is good *balance*. No part of these labels is too heavy for other parts. It is harder to get balance in the left edge style of composition because there is no *symmetry*. (e) There is variety in the style of letter used, but not too much. If too many kinds of letters are used, attention is called to the lettering rather than to the information it gives. Too much variety always tends to destroy unity. (f) There is *harmony* of line shown in the panel and boxed form where the lettering forms rectangular shapes which follow the lines of the margin. There is harmony in the fact that an appropriate lower-case and figure was used with the capitals.

Exercises of this type are very interesting to the pupil and a surprising variety of designs for various purposes may be drawn.

That the single line letter has an actual place in commercial design is shown by Fig. 10 and many other examples which can easily be found on moving picture screens, posters, magazine illustrations, etc. It is a style well worth knowing for its usefulness and beauty.

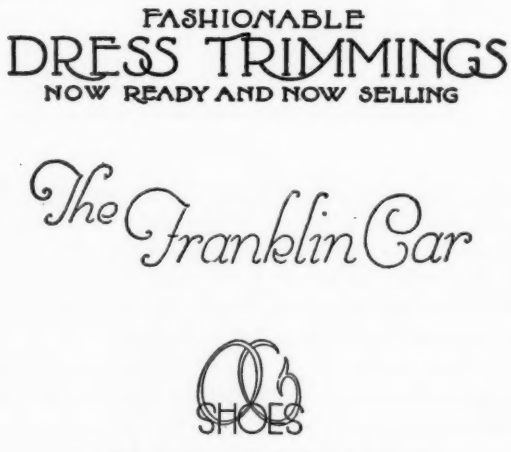


Fig. 10. Parts of Magazine Advertisements.

WANTED—INDIVIDUAL EFFORT

Pedro J. Lemos, Leland Stanford Junior University, Stanford, Cal.

WATCH your step in the vocational trend of art instruction, for it's a strong teacher who will be able to avoid the pitfalls that come with any national educational movement. To accept cut and dried formulas as successfully applied in some other part of the country may be folly and waste of both time and taxpayers' money, if used without consideration, in your school.

If you are told to plan your work along vocational lines, enter the subject seriously, spend time carefully weighing the wants and needs of your industrial localities. Accept the humblest requirement with enthusiasm.

There is no credit deserved if you plunge your class into producing paper stain-glass windows, marble hallway entrances and ten-thousand-dollar platinum brooch designs, when what your community needs is better show-window displays, better box-brand designs and better backyard fences. You say that you believe in higher ideals. So did our good ancestors who decorated the frying pans and rolling pins for parlor decorations. The eternal fitness of an object to its place and fitting of problems to a locality are equal tests of trained judgment.

We hear much of the Smith-Hughes act and there is considerable rushing on the part of many art departments toward making a noise that will sound like industrial or vocational art. Camouflaging of courses to make them appear vocational is becoming an art of its own, and it is amusing to see colleges listing the only vocation benefit derivable from their courses of art as that of teaching art. If a course is limited to training teachers and those teachers are to teach others, just when will the vocational practice of the individual begin? How some schools do hate to roll up their sleeves and begin on the dishes! They will teach the lofty principles, only the theory, and George can flounder around and find the application later. And that is just why all the American Georges are about fifty years late in industrial art today.

Let us as teachers of art come down to earth,—find our local needs, begin with bettering our small requirements and climb the ladder from the beginning and not start half way up.

We must discard our Victorian era ideas about what composes high art. High art may enter into whatever humble object we work upon. It depends entirely upon the individual worker's approach of the problem. Someone said, "When love and skill work together look out for a masterpiece." Teachers must instill more enthusiasm in students for their community problems, even tho it may not be working in rainbow colors or in silver and jewels. One thing they may be sure of, and that is that he who produces much with little will never fail when much is permitted; for the restraint which comes with little is the practice which will prove to be the guide where much is allowed.

In his lecture on "Art," Emerson says:

"Beauty must come back to the useful arts and the distinction between the fine and the useful arts be forgotten. If history were truly told, if life were nobly spent, it would be no longer easy or possible to distinguish one from the other. In Nature all is useful, all is beautiful. Beauty will not come at the call of a legislature, nor will it repeat in England or America its history in Greece. It will come, as always, unannounced, and spring up between the feet of brave and earnest men."

With Emerson's prophetic vision could he have given a message more applicable in these days of much legislating toward industrial arts? While we welcome the legislating and its material support, its whole effort will be wasted unless each individual art, vocational and industrial teacher makes it his life work to see that he is worthy of such a trust. It's a great responsibility, and cheerfulness and intelligent co-operation with community needs will go a long way toward making the task an enjoyable one.

Lavalier designed and made by Emil F. Kronquist, Washington High School, Milwaukee, Wis.

INDUSTRIAL-ARTS MAGAZINE

Board of Editors

E. J. LAKE S. J. VAUGHN

W. H. HENDERSON

EDITORIAL

PATRIOT OR PACIFIST

WE are all becoming enthused with the vague idea that out of the evils of war much good is to come to those agencies of civilization which are considered most foreign to war. The schools are to be revised and rejuvenated; the industries are to be better related to the schools and to society; the arts are to be vitalized; institutions are awake to their reponsibilities and possibilities.

There has developed a great enthusiasm to do wonderful things and even the most indifferent pacifist is infected with a desire to take part. We say "indifferent pacifist" for it is our conviction that a pacifist is an indifferent worker in peace as in war and will accomplish as little in one as in the other.

Now comes the test of the individual. We are each to be proven patriot or pacifist according to our service in bringing about this great reformation. The teacher will have much to do and will receive little credit or remuneration in proportion to the service rendered. Patriots always do receive little reward for service rendered.

The first characteristic of a patriot is self-sacrifice. The next most noticeable characteristic of a patriot is modesty. He is a poor publicity man but he does the necessary thing at the right time and regardless of self-interest. This Christmas is the most opportune Christmas the American people have experienced. They have been preparing for it since war was declared. The teacher is in the opportune position to take advantage of this victorious Christmas and to reconsecrate himself to service.

If the schools are to be rejuvenated the teacher must do his part. If industry is to be developed the teacher must help, for the schools and industry are interdependent. If the arts are to be vitalized, who but the teacher of art can make art vital? Every teacher must swear allegiance to these great reformations. The teacher must be a patriot.

ARTISTS AND DOCTORS DISAGREE.

MR. PENNELL'S reply to Dr. Haney in the American Art Magazine for December is further evidence of his extreme diagnosis and hopeless outlook of the art situation in America.

We did not realize that we were in the horrible state of artistic degradation and despair that Mr. Pennell describes. It is only in his final statement that Mr. Pennell relieves our concern a little by telling us what "*we want*" for we are not certain that *we do want it.* Mr. Pennell says: "We want a National Art Training School—run by artists, for artists—under proper management—by the government." We are certain that we want some other things more than this "Government Art Training School—run by artists for artists."

Mr. Pennell states that he knows little about industrial art other than the graphic arts. We surmise that he knows as little about teaching from the fact that he would organize a school "run by artists for artists" to supply the need of industrial designers. If Mr. Pennell knew more about teaching and industrial art he would know that industrial art depends for its success upon intimate experience with the industry involved. The textile arts; the ceramic arts; the metal arts; the plastic arts; each and every art application to industry is the expression of esthetical conception in some one industrial medium. Where in the world's history has a successful art industry developed, except under accepted industrial limitations? "A national art training school run by artists for artists" does not concern us so much as the common school development of artistic application and the organization of industrial art instruction in close relation to the industries. It is with this latter concern that we are looking hopefully to the Federal Board of Vocational Education. May they discover the light and follow it!

THE TEACHER'S PREPARATION.

AS we begin to shift back to a peace basis, certain ever-present problems begin to press for consideration. One that is always with us is the problem of getting prepared teachers. Now, as in the past, numerous persons are inquiring what books to read and what short cuts to take in order to get positions as teachers of the industrial arts.

Let it be reiterated with emphasis that teaching is an art, that arts are slowly acquired, and that a few books and short cuts are insufficient to make either an artist or an artisan.

Superior teaching is a very difficult and a very rare art. The results of poor teaching are alarming and ruinous because they deal with life and character in the making. Yet, strange to say, the gate to the teaching profession has been almost wide open to any incompetent who had the temerity to ask for a position. For a considerable time in the past, there was some justification for incompetency in the field of the arts, because of the rapid growth of the work, the scarcity of teaching material, and the lack of facilities for teacher training. But excuses are no longer valid. The time is here when incompetency for lack of training is both inexcusable and offensive.

Those who would teach an art must know the art itself thru long continued study and practice

of it. Simply to gather a few generalities about an art, and to acquire a superficial and halting skill in it, must no longer be countenanced as preparation either for an artist or for a teacher of art. After the knowledge, skill, and technique of an art have been acquired, there yet remains to be mastered the large and difficult field of the special knowledge and technique of teaching.

Men may not practice law without professional preparation. One may not practice medicine or surgery without extensive courses in recognized institutions. But it has been true that people could try to teach with practically no training or fitness whatever, the only condition being that they find those who are naive and gullible enough to employ them.

Let those who desire to enter the industrial arts as teachers first realize the magnitude and importance of the task and then patiently and thoroly prepare themselves for it.

INFLUENCE OF WAR ACTIVITIES ON SCHOOL PROCEDURE.

THE intensive realities of the last two years and the pressure upon the schools for real, useful and productive work have brought marked changes in the school procedure and in the attitude of both pupil and teacher towards school work.

When one thinks of the extremely practical school activities of the last two years in the Red Cross, Y. M. C. A., and other war relief agencies, one recalls with amazement the formal and futile routine that held sway a few years ago. An examination of textbooks and courses of the pre-war period, with their formal and senseless "exercises and tool processes" and their ridiculous coat hangers, tie racks, string winders, and other "models," reveals a pathetic and appalling lack of rich, vital and inspiring material.

It is now a matter of great concern whether we profit by the experiences of these war years and adopt as permanent policies the temporary measures that the stress of war made advisable, or whether we shall impotently and languidly drop back into the archaic methods and systems that have so long over-stayed their usefulness in our schools.

The Editors have sufficient faith in the wisdom and sanity of the industrial arts teachers to believe that the advance recently made is only the beginning, and that a system of industrial work worthy of the name will very soon begin to take form in our public schools.

SELECTIVE CONSTRUCTION.

AN artist desires to make something beautiful, or something appreciative; an inventor, something useful. They begin, with this vague thought, to select their images, and as the construction proceeds, it is as new to them as to others, and satisfies them, if it meet the general requirement of their first thought. Later in the growing process the end becomes more definite, as the possibilities of the creation become evident. The artist then projects lines of possible combination, to be filled in by actual representations.

The further element is a feeling of adaptation to this end. It seems to consist in a sense of the adaptation of means to end. Only by it is the exclusive and selective attention guided in its choice of elements. As a feeling, it extends thruout our entire mental and active life. We pass involuntary judgment on the fitness of an instrument for its use, of the material for a garment, of an officer for his office. This feeling, in its variations in individuals, is in large part the basis of artistic talent. The general proportions of things, the relative value of details, the harmony of discordant meanings, the reduction of varied elements to a fundamental motive—these and many other problems of the artist call this feeling prominently into play.—*Charles Kendall Adams.*

HOW TO GROW EXECUTIVES.

NO organization should lose sight of the fact that its success and prosperity is due to the work of its combined forces, and no man in its employ who has risen in any degree whatsoever above the ranks should be too unimportant to have his growth and development followed with careful and individual concern. The employee may not know that his natural talent is being studied; that his character is being developed; that his training is being systematically carried on by advice, counsel, or by direction. He only knows that, as he becomes qualified, the position of greater responsibility awaits him; that as more responsibilities fall upon him, greater avenues will open for him to become acquainted with the manner in which to meet such responsibilities; that as the time arrives when he has exhausted the possibilities of the line of work in which he is engaged, he may many times, without previous request, be transferred to other work, opening up possibilities for a new development.

He further knows that so long as he is ambitious to advance he need not worry about his position and thus he has that peace of mind which is the best environment for the growth of ideas.—*Luke C. Bradley in Factory.*

Western Arts Convention.

The Western Drawing and Manual Training Association has announced that its 1919 convention will be held in Chicago, May 6 to 9. The sessions and exhibits will be housed in the Art Institute. Correspondence concerning the convention may be directed to Mr. L. R. Abbott, Secretary, Grand Rapids, Mich.

Correlation of Manual Arts with Academic Branches

While correlation of academic branches in elementary schools has been developed to the point of diminishing returns, the manual arts instruction has not fully shared in the development, and much of the practical information given in the shop has been overlooked by the general class teacher. Manual training men have been responsible in part for this situation, because they have rarely taken the initiative in suggesting the actual material which can be used in the teaching of spelling, geography, arithmetic, etc. They find fault with the unsympathetic attitude of the class teacher but they rarely open to her the wealth of vitalizing teaching material that is contained in the materials and processes which so strongly interest the boys in the shop.

Quite a contrast to the average situation and altogether worthy of study as a practical example, is the plan of correlation worked out in the schools of Erie, Pennsylvania.* Thru the co-operation of Supt. Ira B. Bush, the department of vocational education has worked out a plan by which each teacher in the fifth to the eighth grades inclusive, receives a monthly "correlation sheet" to be used in the instruction of classes in English, arithmetic, geography, spelling, etc. The sheets have been prepared by Mr. E. L. Bowman, director of vocational education, or by shop teachers under his guidance. The purpose is to make clear to the teachers the work of the department and to bring to their attention some important phase of shop practice or theory each month. This general informational material is followed by a carefully worked out suggestion for a type of correlated teaching which the teacher should use during the month.

The material which follows is the substance of three typical "correlation sheets" and will illustrate the spirit as well as the material.

THE SCHOOL DISTRICT OF THE CITY OF ERIE, PA.

Department of Vocational Education.

MANUAL ARTS CORRELATION SHEET.

English—Arithmetic Grade VIII—Printing.

To the Teachers.

We are beginning a new year, with all that is implied in the way of beginning new and better ways of doing our work. Do you remember James's Laws of Habit: "Start with as determined an initiative as possible," etc.? Never before has there been so clearly seen the need for keeping boys in schools as long as possible. Never before have the money temptations for leaving school been so great.

One way to keep boys from leaving school is to make their school work so interesting that they will not *want* to leave school. You can make your classwork more interesting by bringing in the outside world. Try using some means of correlating your work with the shopwork the boys and girls are doing. The department of vocational education will furnish you from time to time with suggestions for correlation. You can put these suggestions into practical use much better if you visit the shops and learn the nature of the work that is being done there. You will be cordially welcomed, and the shop teachers will do all in their power to make clear to you any matters that you may not understand.

Keep these correlation sheets on file. You will find them useful for reference later. Your suggestions for new sheets or for improvement of old sheets will be welcomed. LET'S GET TOGETHER AND DO THIS!

Use this material in your academic classes during the weeks that your boys are taking the subject from which the material has been drawn. Teach printing terms while the boys are studying printing, and electrical terms when they are working in the electrical shop.

Spelling Words from the Printshop.

Letterpress, engraving, intaglio, lithography, zincography half-tone, etching, embossed, serif, font, capitals, lowercase, California, nonpareil, pica, brevier, long primer, English, Columbian, great primer, composing, distribution, caret, overlook, overrun, imposing stone, chase, reglet, quoin, proofplane, platen, tympan, reservoir, disk, flywheel.

Topics for Oral and Written Composition Suggested in the Printshop.

The three main printing processes: letterpress, engraving, offset-printing. How a California job case is laid out. How I set my first stick of type. The proof-reader's job. Type sizes and type faces. How a job press is made and operated. The imposing stone.

Arithmetic Problems from the Printshop.

1. A "point" is .0138 inches. How high is the body of a line of nonpareil (6-point) type? Brevier (8-point)? Pica (12-point)? Long Primer (10-point)?

2. An "em" is the square of the body of any given type. What is the area in square inches of a 6-point em? Of a 10-point em? Of a 12-point em?

3. The unit of measure of length of a line of type is the pica or 12-point em. How many pica ems to the inch? Measure the width of the printed portion of your arithmetic page with a ruler, and determine how many ems measure it was set. Measure a column in your newspaper and tell how many ems measure was used.

4. Taken any given paragraph of your arithmetic, measure its width and determine how many ems measure it was set. Count the number of lines and by multiplying width by depth, determine the number of ems in the paragraph. In what size type is it set? How long and how deep would it be if it were set in 6-point? In 8-point? In 10-point? In 12-point?

5. Typemetal is 80 per cent lead and 20 per cent antimony. Lead weighs 710 pounds per cubic foot. Antimony weighs 422 pounds per cubic foot. Find the weight of a cubic inch of typemetal.

6. The height of type is .9186 inches to the top of the face. If the type were solid to the top of the face, how much would the type for one page of your arithmetic weigh?

7. What is the weight of an em quad of 72-point type? Of 48-point type?

8. If a pressman spoils 3 per cent of his stock, how many perfect impressions will he get from 3,800 sheets of paper? How long will it take him to run the whole at 850 impressions per hour?

9. If the cost of presswork is figured at $1.00 per hour, how much per thousand impressions (perfect) should be figured in counting the cost of the job in No. 8?

Layout of a California Job Case. (*Illustration.*)

The Parts of a Piece of Type. (*Illustration.*)

MANUAL ARTS CORRELATION SHEET.

Semester 2, No. 4.

English Composition—Spelling Grade VI—Woodworking.

Organization of Instruction in Woodworking.

The first courses in woodworking consisted of a series of models, as they were called, which every boy was required to make. This method of instruction has disappeared from the best school systems because it did not provide for instruction in all the tools and processes of the shop, and because it did not give any place for the development of originality and initiative. It has been replaced by the tool-group method, in which instruction is organized about a tool or group of tools and a number of projects are offered the pupil for choice, and suggested, any one of which illustrates the tool-processes taught, for solution. This is the method adopted for the city of Erie.

Correlation of Classroom Instruction with the Tool Groups.

Below is given the outline of instruction in sixth-grade woodworking with some suggestions for relating the schoolwork with the shopwork. The word lists were prepared by Mr. H. A. Sotzin, of Gridley Center, and Mr. Jonathan Bright, of Wayne Center.

Sixth Grade Woodworking Groups I and II.

Tool-group I—Laying out and sawing.

Tools employed—Bench-rule, steel square, pencil, crosscut saw, rip-saw, back-saw.

Processes taught—Squaring, measuring, marking, cross-cutting, and ripping.

Projects suggested—Stock for future projects, sidewalks, fences, etc.

Tool-group II—Smooth-planing.

Tools employed (New tools)—Jackplane, trysquare.

Processes taught—Sharpening plane, setting plane, use of vise, and bench stops, smooth planing, planing out of wind, out of warp, planing surface and edge, marking working face and edge.

Swing board, box materials, toolrack, etc., etc.

Suggested Spelling Words for these Groups.

Group I—Horse, square, steel, scribing, crosscut, rip-saw, gaging, rule (not ruler), measure, tongue, blade, beam, trysquare, bench, vise, bench-stop, bench-hook, back-saw, miter-box, dimensions, poplar, bass, pine, blueprint, drawing.

Group II—Plane, plane-iron, bevel, thumbscrew, adjusting, lever-cap, sole, roughing, jack-plane, warped, wind, joint-edge, emery, oilstone, Arkansas, India, Washita, wire-edge, testing, red-gum, mahogany, chestnut, waste, frog, cap-screw, throat, corrugated, jointer, fore-plane.

Correlation Sheet—Board Measure.

Introduction—In the past, serious difficulty has been encountered because the methods taught for finding board measure, as set forth in the textbooks, were not those of the shop-teacher and the lumberman. To harmonize the practice in classroom and shop, this correlation sheet is submitted. Teachers will kindly employ this method as a standard, and drill their pupils accordingly.

Unit—The unit of measure is the board foot. One square foot in area by one inch thick (144 cu. in.), 1 foot width by 1 foot length by 1 inch thickness.

Formula—When figuring lumber use the following: Multiply the thickness and width in inches by length in feet and divide by 12.

Problem—How many board feet are contained in a piece of stock 10 feet long, 2 inches thick, and 11 inches wide?

Thickness—When figuring lumber, stock less than 1″ thick is figured as 1″ thick. A special price is often given for material resawed to thicknesses less than one inch. All lumber thicker than 1″ is reduced to 1″. ¼″ lumber made from 1″ stock resawed. ⅜″ lumber made from 1″ stock resawed. If the price of 1″ stock is $60.00 per M ft. board measure, add $5.00 per M for resawing, making a total of $65.00 per M. one-half of which, namely $32.50 per M, would be the price of ¼″ and ⅜″ lumber. ½″ lumber is made from 1¼″ stock; if price is $60.00 per M foot measure add to the $60.00 one quarter or $15.00, making the same $75.00 per M, then add $5.00 per M for resawing, totaling $80.00 per M, one-half of which is $40.00 per M, being the price for ½″ lumber.

Odd Thicknesses—1¼″ lumber is figured as such, for example, 1,000 feet board measure of 1¼″ lumber would require 800 feet surface or face measure, then add ¼ to this makes 1,000 feet board measure. 500 ft. face measure of 2½″ stock making 1,250 feet board measure. 500 ft. face measure of 3″ stock making 1,500 feet board measure. 500 ft. face measure of 4″ stock making 2,000 feet board measure.

Boards—

3″ wide will contain ¼ as many bd. ft. as they are ft. long.
4″ wide will contain ⅓ as many bd. ft. as they are ft. long.
6″ wide will contain ½ as many bd. ft. as they are ft. long.
9″ wide will contain ¾ as many bd. ft. as they are ft. long.
15″ wide will contain 1¼ as many bd. ft. as they are ft. long.
16″ wide will contain 1⅓ as many bd. ft. as they are ft. long.

This material prepared by J. E. Zearfoss, Washington Shop Center.

Domestic Arts Correlation.

A correlation plan similar to that employed for boys who are in the manual arts shops is used by the teachers of domestic arts. The following is typical:

Spelling Lists.

I Semester.

knot	cotton	boll
needle	huckaback	ginning
emery	crash	cotton-gin
scissors	damask	baling
thimble	sateen	hygiene of clothing
basting	kindergarten	personal hygiene
stitching	denim	textiles
overcasting	floss	principal
overhanding	poplin	principle
hemming	galatea	vegetable
napery	satin	scrim
seam	warp	gingham
placket	woof	percale
casing	fiber	ticking
tape measure	laboratory	vertical
canvas	selvedge	horizontal
flannel	cultivating	
cretonne	planting	

II Semester.

Indian Head	lawn	filling
darning	bale-breaking	Arkwright
shank	absorbent cotton	muslin
initial	guncotton	great wheel
picking	Eli Whitney	flax wheel
carding	dimity	adulteration
spinning	sliver	Compton
dyeing	loom	

Some Suggested Topics for Composition.

I Semester.

1. Materials suitable for towels, with reasons.
2. Making a sewing bag.
3. Culture of cotton in the United States.
4. Growing of cotton: planting, gathering, ginning, baling.

II Semester.

1. Sketch of the life of Eli Whitney, Arkwright, or Compton.
2. Cotton growing.
3. Bale-breaking, picking, carding, spinning, and weaving.
4. How cotton cloth is adulterated.
5. Tests for adulteration.

GEORGE F. BUXTON
Associate Professor of Vocational Education,
Indiana University.

Since assuming the chair of vocational education at Indiana, Prof. Buxton has established several classes in industrial teacher-training. The latest class was opened in Evansville early in November.

Prof. Buxton is a native of Maine and received his early education in Portland. He is a graduate of Pratt Institute, Teachers College, Columbia University, and the University of Wisconsin. During a period of twelve years he was connected with Stout Institute and has been director of the summer sessions. His earlier experience includes teaching at Newark, N. J., Portland, Me., and Springfield, Mass.

Twenty-one Illinois cities have been granted a total of $17,802 as reimbursement for courses in vocational education under the Smith-Hughes law. In addition, $8,673 has been granted for teacher-training courses in vocational subjects conducted by the State University, the Normal University, and the Southern Illinois Normal School.

TO PROMOTE RELATIONS OF SCHOOLS TO COMMERCE, INDUSTRY AND LABOR.

The U. S. Bureau of Education in co-operation with representatives of industrial and labor interests is engaged in a study of the relation of the public schools to industry and labor, in an effort to determine just what the schools can do and what co-operation can be obtained from organized industry, commerce and labor.

The details for the study were determined upon by a conference which included Dr. P. P. Claxton, Commissioner of Education; C. E. Shaw, National Association of Corporation Schools; J. H. Defrees, United States Chamber of Commerce; A. E. Holder, American Federation of Labor; John W. Dietz, National Association of Corporation Schools, Glen L. Swiggett and Wm. T. Bawden, of the Bureau of Education.

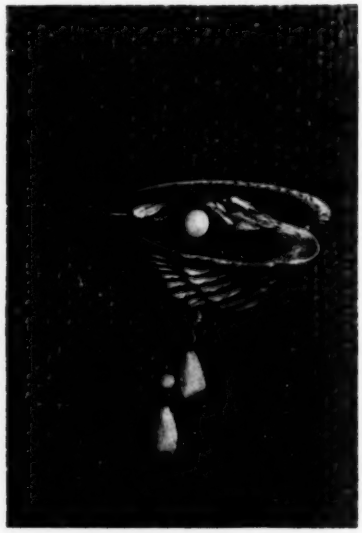
The conference agreed upon a tentative statement of the problems involved. It declared among other things that there exists a gap or break between the point at which the general education of most boys and girls ends and the point at which they may gain a foothold in commercial or industrial life.

It is not regarded as the legitimate function of schools supported by public taxation to give the specific training required by particular jobs in commercial or industrial plants. The burden of giving such specific instruction except as may be provided for by vocational schools, is a proper charge on commerce and industry.

It is believed that to general education should be added provision for assisting boys and girls to determine the direction in which they may make the best use of their native talents and opportunities, and to prepare for useful service in the world. This provision should be made at public expense and should be made available to all boys and girls.

It was decided that the study which is now being made should determine primarily what co-operation can be given to the solution of these problems by industry, labor and commerce. It was brought out that in a number of cities such co-operation is already effective. The conference, therefore, requested the commissioner to make a preliminary inquiry to determine the most advantageous point or points at which to make a study of the methods which have proven successful in accomplishing the desired results.

Accordingly preliminary letters have been sent to corporation schools, trades unions and chambers of commerce to ascertain (1) where and what official notice has been taken of local needs for closer relation between the schools and the bread-and-butter life of pupils, (2) what organizations have co-operating committees, and (3) what definite results have been achieved by means of co-operation. The movement has been officially endorsed by Samuel Gompers, for the unions, Harry Wheeler, for the United States Chamber of Commerce, and Dr. H. M. Rowe, for the Association of Corporation Schools.



Pin Designed and Worked in Gold by Emil F. Kronquist, Milwaukee, Wis.

DR. EDWIN G. COOLEY
New Head of the Chicago Continuation School System.

JUNIORS SET THE PACE.

Los Angeles school children in their Junior Red Cross activities have set the pace for patriots in that western city. Even tho the war is over these children will continue to devote their talent to patriotic and national service.

Recently the children in the drawing classes tried their hand at poster making, with brilliant results. Posters of food-saving, Red Cross needs, War Saving Stamps, and other activities have been turned out by the children, many of them displaying remarkable talent.

Supt. Shiels was one of the first school superintendents in the country to introduce war work in his schools after America entered the fight against Germany. A large percentage of the children belong to the Junior Red Cross. They produced useful articles to the value of many thousands of dollars for the use of our soldiers.

MR. COOLEY ASSUMES DIRECTION OF CONTINUATION SCHOOLS.

Edwin G. Cooley, formerly superintendent of the Chicago public schools, and more recently with the Red Cross, has been elected Director of the Continuation School System of Chicago, with the rank and pay of a high school principal.

Mr. Cooley was born in Iowa and attended the schools of his native state. He attended Iowa State University and Chicago University. His first teaching position was at Strawberry Point, Ia., and later he was appointed to the superintendency at Cresco.

In 1891 he resigned to become principal of the high school at Aurora, Ill. Later he went to La Grange to fill a similar office and upon the death of Col. Parker he was elected principal of the Chicago Normal School.

In 1899 he was elected superintendent of the public schools of Chicago, from which position he resigned to become president of the D. C. Heath Publishing Company.

Mr. Cooley some years ago made a trip to Europe to study the industrial school system of Germany. He is a leading authority on subjects pertaining to industrial and continuation schools.

SCHEDULE CONVENTION.

Mr. Elmer W. Christy, secretary-treasurer of the Ohio Industrial Arts Association, has announced that the organization will hold its annual meeting in Columbus, on February 7-8, 1919. An unusually large attendance is anticipated because of the variety and importance of the problems which are arising for solution during the reconstruction period. Information about the convention may be had by addressing Mr. Elmer W. Christy, in care office of the board of education, Denton Bldg., Cincinnati.

Mr. L. Day Perry has become a director in the Division of Rehabilitation of the Federal Board for Vocational Education. He is located in District No. 8 which has its headquarters in Chicago.

Mr. C. C. Sterling, for several years instructor in the Manual Training Department at Toledo, O., has resigned to accept a position with the Tillotson Mfg. Company of the same city.

PROBLEMS AND PROJECTS

The Department of Problems and Projects aims to present each month a wide variety of class and shop projects in the Industrial Arts. Readers are invited to submit successful problems and projects. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

A HAND-POWER CART.

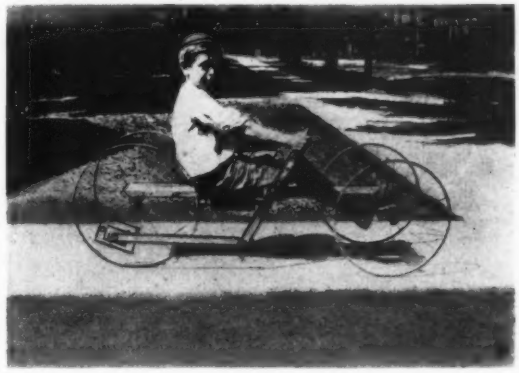
H. H. Harrison, Marshall, Mich.

The hand-power carts which can be bought have made many boys happy, but not so much so, I'm sure, as the carts which they made themselves. Here is a hand-power cart which they can make themselves and very easily too.

The drawing shows clearly just how this cart is made. The wheels should be about 30″ in diameter and the front ones a little smaller than the back ones. The length of the cart is determined by the length of the boy, and the levers, etc., are placed so as to be most convenient for him. The dimensions given in the bill of material will make a cart which will be right for the average seventh-grade boy.

A little care will be necessary in adjusting the levers, but if they are placed as in the illustration, spoke connection down, power lever vertical, and the power connection horizontal, the cart will work right.

The material needed for the wood parts may vary, any strong wood which does not split easily will do, and broom sticks make excellent levers and connections.

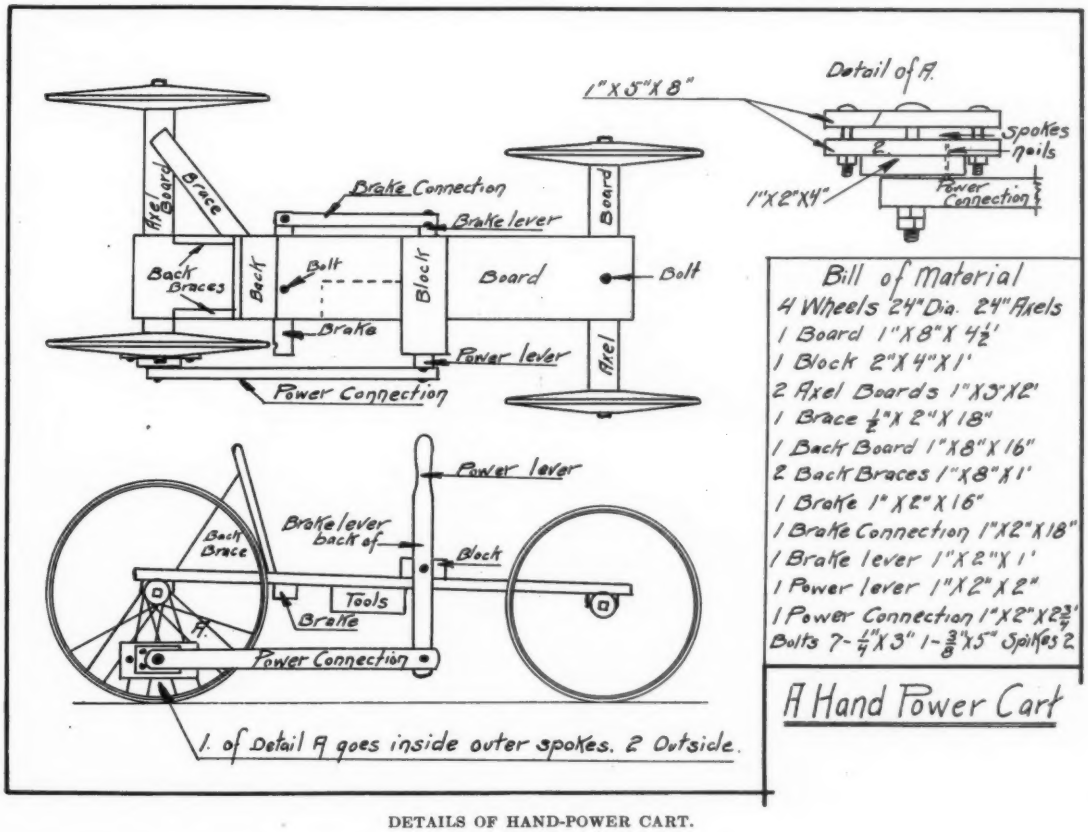


A Hand-Power Cart.

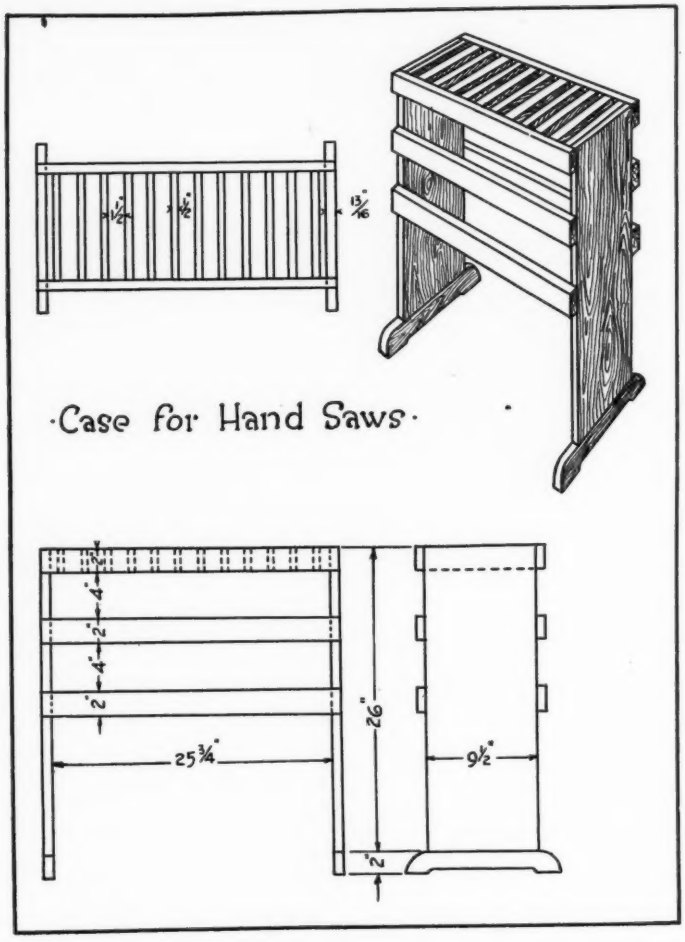
A SAW CABINET.

Samuel Hughes, Berkeley, Cal.

In devising ways and means of keeping the shop tools in order with a minimum amount of personal attention, I am often reminded of the story of a boy who was being taken to task by his mother for heaping all of his belongings miscellaneously into his bed-room closet. "Don't you know, Willie," she said, "that you should have a place for everything?" "I have, Mother," he replied. "This is it." Now whether you agree with Willie's idea of economy or not, you will agree with me that he represents a good ninety per cent of your pupils and mine. Any elaborate system of caring for tools necessitates a constant supply of energy behind it



DETAILS OF HAND-POWER CART.



Details of Case for Hand Saws.

that might better, or at least more agreeably, be spent in some other way.

I am enclosing perspective and working drawings of a case for keeping hand saws, that has made it easier for these particular tools to find their way home after being used. It is simple, light, portable, and neat in appearance, and there is no danger of finding a drawing knife or brace reposing in the place that you had solemnly decreed to be the home of the rip saw. The carpenters' squares find their way to this case also. It stands near the tool room window but outside of the tool room.

BLUEPRINTING FRAME.

A. J. Conrad, Oahu College, Honolulu, T. H.

This printing frame makes an excellent project for the high school woodworking class, and is a valuable and neat appearing asset to any mechanical drawing department.

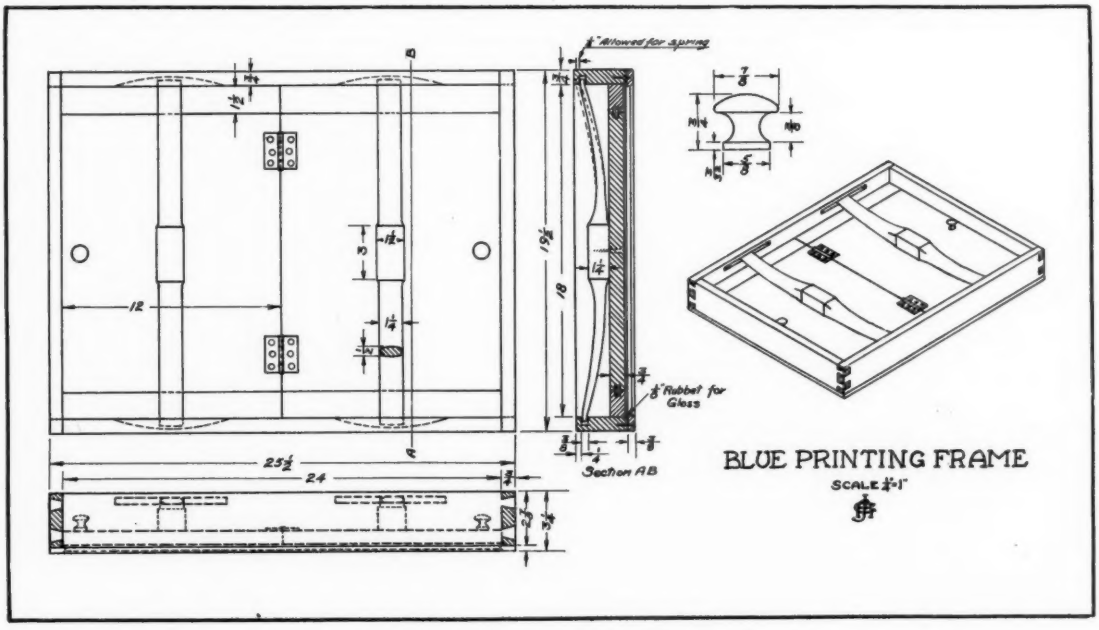
It is made from quarter-sawed oak with springs of white ash. In making the springs it should be noticed that at least $\frac{1}{8}$" must be allowed so they may be sprung into position in the grooves in the sides of the frame. This is shown by dotted lines in section A B on the drawing.

The frame is finished by being subjected to ammonia fumes, sanded down, and given three coats of thin orange shellac; each coat being sanded lightly. The final coat should be polished with a dry cloth. Felt makes a very good pad and is most convenient if glued to the back.

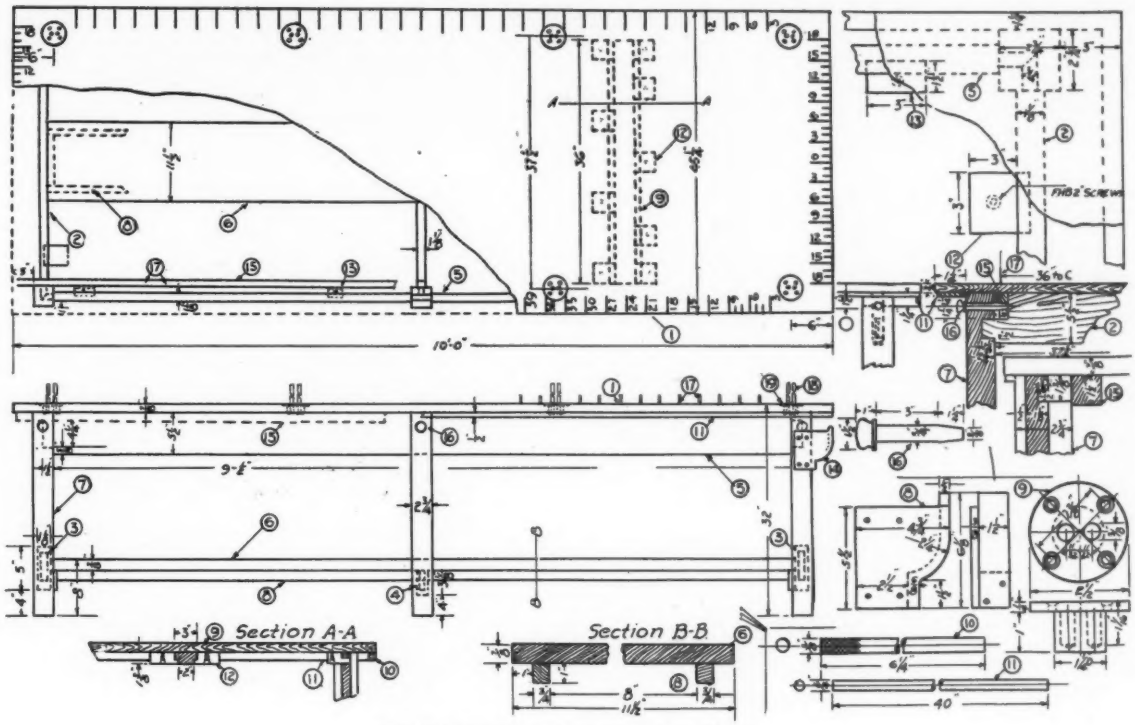
A TEN-FOOT CUTTING TABLE.

This table is to be made of white pine, poplar, bass, or redwood, free from knots and other injurious defects that will impair the usefulness of the table. The rails are fastened to the legs with pinned mortise and tenon joints and are glued. It is necessary that all tenons fit accurately.

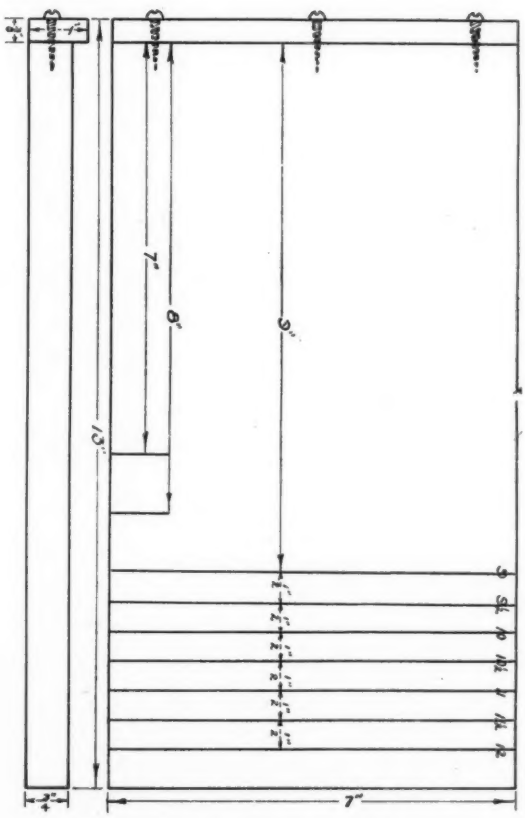
The top is made of pieces not over nine inches wide, joined accurately and glued. The edging strip is fastened to the top with screws



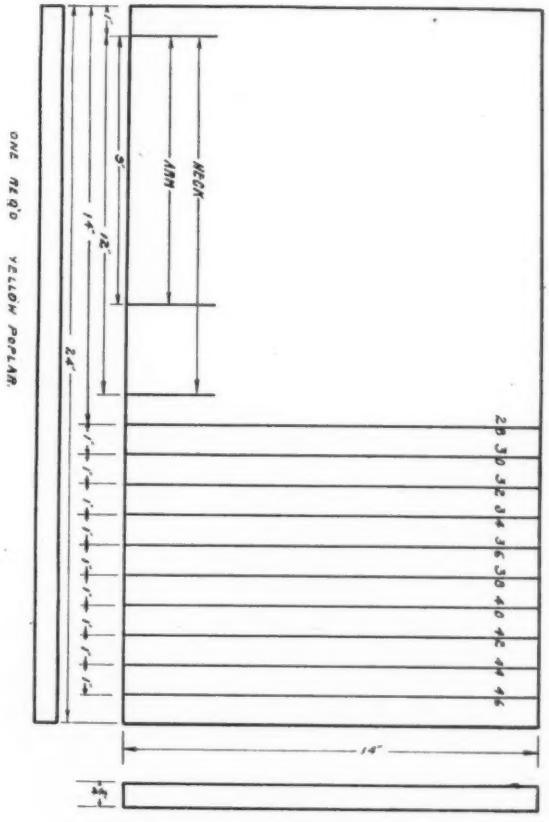
DETAILS OF BLUEPRINTING FRAME.



DETAILS OF RED CROSS CUTTING TABLE.



Details of Sock Gauge for American Red Cross.



Details of Sweater Gauge for American Red Cross.

and the top is joined to the rails with blocks as shown on the drawing.

The needle bar is made of hardwood, 1¼″x1½″. The rails are cut out to permit easy movement of the bar; the bar is placed in position and holes are drilled ¼″ diameter thru the top and scant 3-32″ diameter in the needle bar, ½″ deep. The needle is made of 3-32″ drill rod cut to three inches long.

The needle bar is held in place by adjustment pins as shown on the drawing. These pins are to be an easy fit to allow adjustment of the bar up and down.

The spacer plates may be made of cast iron, or may be machined from solid stock. The knurled rods are made of cold rolled steel, ⅜″ diameter x 6¼″ long. The rods are made of steel ¼″ diameter and 42½″ long. All parts must be machined accurately to the sizes shown on the drawing. The knurled rods must be an easy fit in the spacer plates.

The table is planed and sanded smooth and given one coat of shellac and two coats of varnish. Before applying the second coat of varnish to the top of the table, mark off with a ruling pen and indelible drawing ink, lines one inch apart. The lines must be accurately spaced and must be 1¼″ long, every third line to be 1¾″ long. Every third inch mark must be stamped as shown on the drawing.

Bill of Materials

Item	*Name*	*Size*	*Req.*
1	Top	⅞″x45¼″x10′ 0″	1
2	Upper Cross Rail	1⅛″x5½″x39¾″	3
3	Lower Cross Rail	1⅛″x5″x39¾″	2
4	Lower Cross Rail	1⅛″x3½″x39¾″	1
5	Side Rail	1⅛″x5½″x9′ 3½″	2
6	Stretcher	⅞″x11½″x9′ 1⅞″	1
7	Legs	2¾″x2¾″x31⅛″	6
8	Cleats	¾″x1″x4′ 6¾″	4
9	Battens	1⅜″x3″x34½″	2
10	Edging Strip	½″x2⅞″x45¼″	2
11	Edging Strip	½″x1½″x10′ 0″	2
12	Blocks	1⅜″x3″x3″	36
13	Blocks	1⅜″x3″x1½″	20
14	Rod Holder	Right and left hand	2
15	Needle Bar	1¼″x1½″x10′	2
16	Adjustment Pin	1½″ diam. x 5¼″	6
17	Needles	Drill rod steel 3-32″x2⅛″	60
18	Knurled Rod	C. R. steel ⅜″x6¼″	8
19	Spacers	Cast iron 2½″ diam. x 1¼″	8
20	Rods	C. R. steel ¼″ diam. x 42¼″	30

MEASURING DEVICES FOR RED CROSS CLASSES.

J. M. Sterling, Instructor in Manual Training, Toledo, O.

The accompanying drawings illustrate two simple measuring devices made for the Red Cross workers in the Woodward School, Toledo. The boards have been found to be handy for quickly and accurately determining the size of knitted articles.

In the Woodward School the boards were made of poplar or maple but the former stock was found to be most easily worked and best adapted to the purpose. The lines were put on by several methods. The simplest and most effective plan was to give the board a single coat of shellac and then to mark it with black drawing ink. Three coats of varnish were then applied.

The Woodward School made a large quota of bedside tables, bread boards and other articles suitable for use in Red Cross work centers and convalescent homes.

ORCHARD LADDER.

Louis M. Roehl, Cornell University, Ithaca, N. Y.

There are many ladders diversified in design, which are used for orchard purposes, of which the common step ladder and painters' ladder are perhaps the most numerous. For orchard purposes the former has the disadvantage of four supports and narrow spread of standards which make it unstable on uneven ground. The latter needs to be supported at the upper end by leaning against the limbs of the tree which is often harmful to the tree and usually rather unstable.

The three-legged ladder with wide spread of standards has the advantage of stability on uneven ground as well as on the flat surface. It is also light and tall enough for most orchard purposes.

Orchard Ladder.

Bill of Material.

Pieces	*Dimensions*	*Use*	*Material*
2	13/16″x4″x4′ 2″	Standards	White pine,
2	13/16″x4″x2′ 8″	Bottom standards	cypress, bass-
1	13/16″x8½″x15″	Top	wood, or
1	13/16″x4¾″x24½″	Bottom step	other soft
4	13/16″x4¾″x10⅝″	Steps	wood.
2	13/16″x3″x8″	Upper rod brace	
2	13/16″x2½″x8¼″	Cleats	
1	13/16″x3″ tapered to 3″x5′ 2″	Brace	

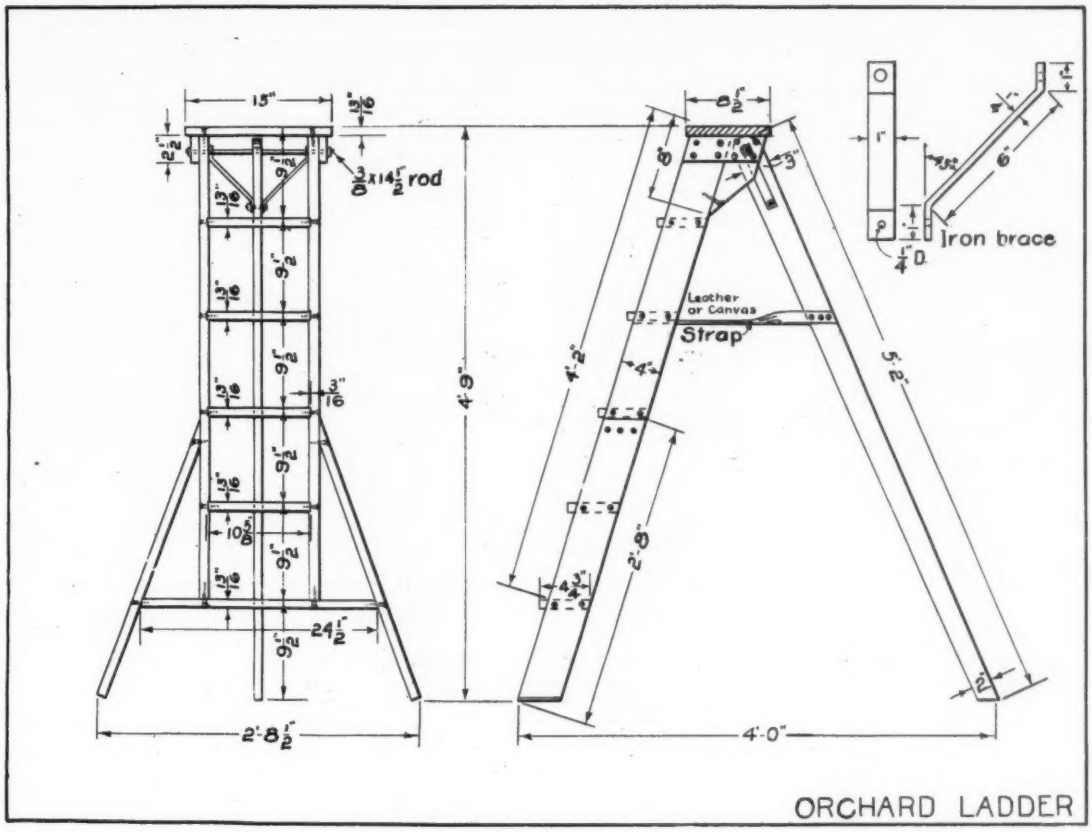
Hardware—

1 iron rod ⅜″x14½″ with two nuts and two washers.
38 flat head bright wood screws 1¾″ No. 9 or 10.
18 flat head bright wood screws 1½″ No. 8 or 9, for cleats and upper rod brace.
2 pieces flat iron ¼″x1″x8″ for braces.
1 machine or stove bolt ¼″x1¾″.
1 piece canvas strap 1½″, 20″ long.
6 round head blued screws ¾″ No. 7 with washers.

Directions—

These directions presuppose a knowledge of how to reduce a piece of wood to the dimensions, length, width and thickness.

1. Reduce all pieces to finished dimensions.
2. Set the T-bevel at 1″ on the beam and 3¼″ on the blade of the steel square and lay out both ends of all standards, and remove the stock to line with the cross-cut saw.
3. With the T-bevel set at the same angle as for the standards, lay out a dado 3/16″ deep for each end of each step on the inside of each main standard at the measurements shown on the drawing and remove the stock with a ⅛″ or ¼″ chisel.
4. Using the T-bevel as set for the above lay out the ends of the cleats and remove the stock to line with the saw.
5. Lay off the upper end of the upper rod braces with the T-bevel set as for the standards and remove stock to line with the saw.
5. Cut a slant to the lower ends of the upper rod braces as shown on the drawing so that they may be fastened to the standards with screws. Remove stock with saw and smooth with plane.
7. Round the upper end of the brace. To do this, draw a center line lengthwise of the stock on both sides and on this center line swing an arc with a 1½″ radius 1½″ from the end. Remove stock with saw and smooth with chisel.
8. Set the T-bevel at 2″ on the beam and 4⅛″ on the blade of the steel square and lay out the lower end of the brace. Remove the stock to line with the saw.



DETAILS OF ORCHARD LADDER.

9. The cheek cut on the inside of the bottom standards at top is laid out by use of the steel square Lay the square on an edge of the stock, using the figures 12″ and 4½″. Place the figure 12 on the outside edge at the end and the figure 4½″ on the same edge down on the stock and draw the line. Lay out on both edges. Remove the stock with the saw.

10. Bend the irons for the braces as shown in the drawing. They may be bent cold if securely held in a metal vise.

11. Centerpunch for the holes and bore ⅜″ holes at upper ends and ¼″ holes at the lower ends of the braces, using the drill press or breast drill.

12. Bore a ⅜″ hole thru the upper end of the brace at center to receive the rod.

13. The first parts to be assembled are the steps and main standards. Use two 1¼″ No. 9 or 10 flat head wood screws at each joint. Bore holes for the screws, using a twist drill, thru the standards and countersink the holes. Clamp the parts firmly in place and force the screws into the ends of the steps.

14. Fasten the bottom step to the lower ends of the front standards by use of two 1¼″ No. 9 or 10 wood screws.

15. Fasten the bottom standards to the ends of the bottom step by using two 1¼″ No. 9 or 10 wood screws for each joint and three similar screws to secure the upper ends of the bottom standards to the sides of the upper standard.

16. The top is fastened by using eight screws, four at each end, two thru the top and into the top end of the standards and two into the upper rod brace.

17. Fasten the cleats to the upper rod brace and standards by use of eight 1¼″ No. 8 or 9 wood screws as shown in the drawing.

18. Bore a ⅜″ hole thru the cleat and upper rod brace at each side at point shown in the drawing and assemble brace, iron braces and rod. It may be noted that the rod is threaded at both ends. This is easier to make than to forge a head on a rod and is quite as satisfactory.

19. Bore a ¼″ hole thru the brace and fasten the iron braces to brace with ¼″x1⅛″ bolt.

20. Stand the ladder in upright position with the top level, measure length of strap or chain required for position indicated in the drawing and fasten with three round head blued wood screws at each end. A small washer should be stripped on each screw.

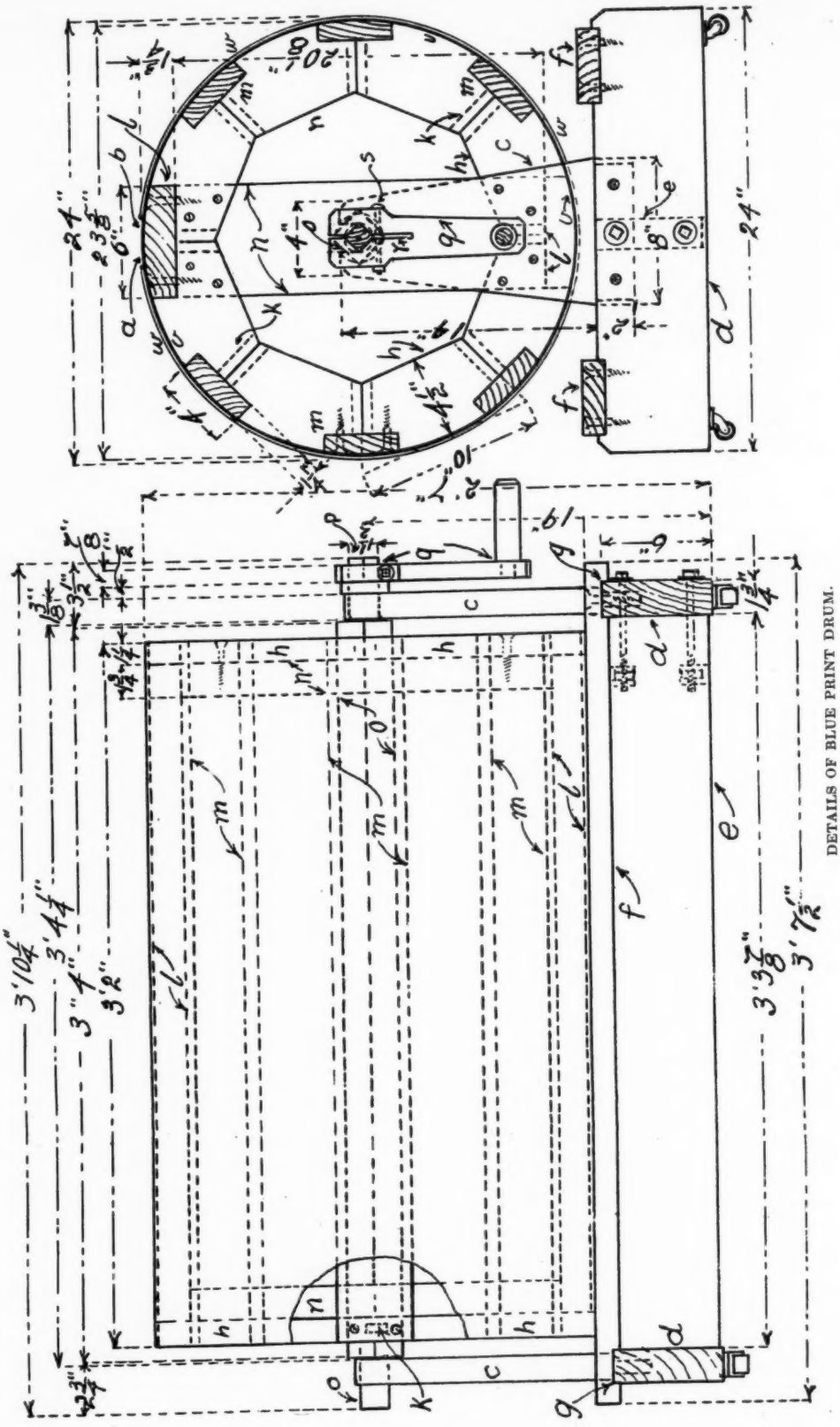
21. Finish the ladder by applying two coats of exterior paint, allowing the first coat several days to become thoroly dry.

A BLUEPRINT DRUM.

Charles A. King.

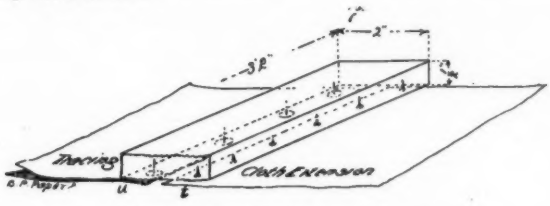
If suitable glass can be secured it is possible to make a blueprint frame large enough to handle a print of any size, but the device illustrated was successfully used in making blueprints up to 3′ 0″x6′ 0″ without glass. The tracing and blueprint paper were fastened with thumb tacks at *a*, and as the drum turned the tracing and paper were drawn tightly around its surface and into perfect contact with each other and fastened at *b*; the drum was then exposed to the sunlight and turned slowly until the blueprint was made.

Any soft wood may be used thruout, excepting the crank and the journal, which should be of hard wood. The standards *c* should be mortised and pinned into the feet *d*, the stretcher *e* cut between the feet and bolted, and the foot rails *f* fitted over the feet with a halved lock joint as at *g*. Each end of the drum requires eight pieces *h* with their ends cut at an angle of 22½°, tongued and grooved as at *k* and glued. After the glue has set it should be scraped off and the surfaces planed; nail the ends together lightly, mark the circle and saw and true the edges of both at once. Without separating the ends, mark and cut notches for the 1¼″x6″ slats *l*, and the 1¼″x4″ slats *m*. Cut braces *n* to fit between slats *l* upon the inside of each end; separate the ends and fasten braces *n* to them with 2½″ No. 12 screws as indicated. Find the exact center of each end and cut a square hole to fit the journal *o* closely.



DETAILS OF BLUE PRINT DRUM.

The slats *l* and *m* may be nailed in place with 8d or 10d finish nails or fastened with 2″ screws as indicated. Tighten the drum upon the journal *o* with wedges driven in glue to hold them and toenail thru the ends into the journal to prevent end motion, reaching thru between the slats to drive the nails out of sight. The outsides of the slats must be planed to conform to the contour of the circumference of the drum, therefore the nails or screws must be sunk so deep that the plane will clear them. The journal *o* is square excepting where it rests upon the standards; its end at *p* should be made square to receive the crank *q* which is split at *r* and may be tightened by the bolt at *s*.



Method of Fastening Tracings to Frame.

The surface of the drum may be formed by nailing a sheet of 28-gauge black or galvanized iron 3′ 2″x6′ 0″ around the drum, beginning at *a* and ending at *b*. Thick Canton flannel stretched tightly over the iron at *w* makes an excellent cushion for the blueprint paper when the paper and tracing are stretched tightly over it around the drum from *a* to *b*. Prints between the size of the largest print frame and the capacity of the drum may be made by tacking a piece of cloth as wide as needed to make the extension to one side of a piece of wood ¼″x2″x3′ 2″ long as at *t*, and the tracing and paper tacked to it as at *u*; the edge of the extension cloth may then be fastened to the drum at *a*, or pinned to the Canton flannel, and the tracing and paper passed around the drum and fastened at *b*.

Rubbing a paraffine wax candle upon the bearing in the top of the standard *c* and upon the journal *o* where it rests in the bearing will lubricate sufficiently to permit the drum to be turned easily. The casters should be of the ball bearing type and have large wheels to allow them to move easily.

The stock list for a blueprint drum of the size described is as follows:

2 Standards (*c*) 1¾″x(4″x8″)x16″.
2 Feet (*d*) 1¾″x6″x24″.
1 Stretcher (*e*) 1¾″x5¾″x3′ 3¾″.
2 Foot Rails (*f*) 1¼″x4″x3′ 7½″.
16 Ends (*h*) 1¼″x4½″x10″.
2 Slats (*l*) 1¾″x6″ 3′ 2″.
6 Slats (*m*) 1¼″x4″x3′ 2″.
2 Braces (*n*) 1¾″x6″x20½″. Verify.
1 Journal (*o*) 1¾″x1¾″x3′ 10½″ Maple.
1 Crank (*q*) ⅞″x3½″x10½″ Maple.
1 28-gauge sheet iron 3′ 2″x6′ 0″.
1 Carriage bolt ¼″x3½″.
1 Set of Casters.

NEW BOOKS.

Medicine as a Profession.

By Daniel W. Weaver, M. D., and E. W. Weaver, Pd. M. Cloth, octavo, 214 pages. Price, $1.50, net. A. S. Barnes Company, New York, N. Y.

The purpose of this book is to present "a fair statement of the requirements for success as will deter the thoughtless and poorly endowed from undertaking the preparation, and at the same time, so alluring as to stimulate promising young candidates to exert themselves to make the fullest preparation before entering upon practice (of medicine). It has been written by a practicing physician and the head of the department of vocational guidance in a large high school so that it has the viewpoint of the active medical practitioner and of educator to whom is entrusted the duty of guiding young men into the right professions. The book takes up, in detail, the personal, financial and social types of service, the system of medicine, the legal and ethical aspects of the profession and the character of education necessary. The presentation of the comprehensive topics of medicine and medical education is made with great fairness and some enthusiasm so that the whole work is interesting and readable.

Style Book.

Argo M. Dill. Paper, 64 pages, 3 by 5 inches. Price, 50 cents. Published by the author, at Mooseheart, Ill.

For its size, this is the most comprehensive book on printing which has come to our notice. It includes the elementary rules of plain composition, compounding of words, punctuation, capitalization, abbreviations, use of numerals, tabular matter, and miscellaneous information.

Shopwork—Joinery, Cabinet Making, Carpentry.

By Herman F. Rusch and Claud C. Conway. Cloth, octavo, 202, XVI pages and 50 pages of plates. Price, $1.20, postpaid. Industrial Book & Equipment Co., Indianapolis, Ind.

Two experienced instructors in high school manual arts have combined in the authorship of this practical volume. They hold, with reason, that much of the practical information which is and should be given in the shop is lost because neither teacher nor students have used a textbook in which this information is systematized and may be referred to.

Part I deals with hand and machine tools and their correct use and suggests a complete method for the development of a project. The material is evidently intended for boys who have had no previous experience and will serve as a review for such as have had work in the grades. Part II is a complete course in joinery, cabinet making and carpentry and constitutes the heart of the work. The treatment of joints is fulsome, but can hardly be criticized when read in connection with a caution against the teaching of joints which are not actually in use in the regular shop problems. The chapter on furniture making is adequate and its value is enhanced by a large number of measured sketches of projects. Part III offers material for shop talks on tools, abrasives, fastening devices, wood, finishing and period furniture. The data is compact, exact and comprehensive and abundant for the average school. A glossary, problems and questions complete the book.

It is quite notable that the authors have not intended the volume to be a complete course, but rather to supplement the average course which is now offered in high schools. In this they are wise when the widely differing purposes of individual schools are considered.

The Practical Art Education of the Public. Dr. James P. Haney, Director of Art in High Schools of New York City. Reprinted from Good Furniture Magazine, Sept., 1918. The pamphlet takes up the subject of art from the industrial and trade standpoints and discusses in particular art in trade, the manufacturer as teacher, the retail salesman as the public teacher, art in school, first steps in teaching, work in higher years, high school work, and the training of taste.

An Exhibition of American Industrial Art. An exhibit assembled by the Art Alliance of America and circulated by the American Federation of Arts. The exhibit is intended to increase interest in American made goods and to offer to students opportunity for a study of processes. At the exhibit are shown designs in direct relation to the methods by which they were reproduced. The exhibit is strictly an experiment and includes work in jewelry, textiles, interior decoration, wall paper, and the graphic arts. The entire collection is traveling over the country and is being shown at the museums of the principal large cities.

A Plea for Art Education. James P. Haney. Reprinted from the American Magazine of Arts, October, 1918. In this interesting article, Mr. Haney recognizes the need for artistic design in the industries in the United States and urges that attention be given to the training of talented art students in order that they may further the art needs of the industries. He points out very clearly that there is an absence of special schools for the training of skilled workers in bookbinding, jewelry, and other allied crafts which have developed in certain sections of the country.

THREE WISE MEN.

On Christmas Eve in the year of one,
Three Wise Men set out for Bethlehem.
Up in the heaven they saw a bright star,
And decided to follow that body afar.
They followed that star thru half the night:
Then it hung o'er the city and shone very bright.
They went to the manger and found the Child,
And everything was quiet and mild.
They were men at least seventy or eighty years old,
But they fell on their knees and offered up gold.
And still we celebrate that memorial day
When Christ, our Lord, was born in the hay.

Martin Lederer, age 11 years,
Maryland Avenue School, Milwaukee.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any question and reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Wood for Wood Cuts.

872. Q.—Will you please inform me what wood is most suitable for wood cuts for printing in presswork?—*M. B.*

A.—Boxwood carved on the end grain is most commonly used by commercial engravers because of its smooth, close grain and uniform hardness. Wood engravings are very rarely put on the press; usually they are electrotyped and the plate is used for the actual printing. The hardest of hard maple is employed for cutting wood type.

Both boxwood and hard maple are suitable for wood cuts made by the pupils, but the former is difficult to obtain and is expensive. Any good block of hardwood, especially birch, maple, or walnut, will suffice for school work.

A Toy Submarine.

873. Q.—Would you please inform me where I can obtain information regarding the construction of a toy submarine?—*M. V. B.*

A.—For small children the "sub" may be cut out of any light wood, with the coping saw, and mounted on rollers. Painted a neutral grey, with the flat deck, conning tower and periscope in black, and a flag, it will be quite realistic. To make a "sub" that will float in water is not so easy. It can be done by whittling a solid block of softwood. The shape should be that of a cigar, except that the cross section should be slightly oval. The conning tower may be a round block, cut out separately and fastened with a nail. A dowel rod may be fitted as the periscope; brads joined with thin wire will make the railing and a little flag will complete it.

It may be necessary to weight the keel to keep the boat rightside up. Paint it grey and black.

Flat Toys.

876. Q.—Please tell me where I can get working drawings for the kind of toys described in the article on "Toy Making for Santa Claus" in the October issue of the *Magazine.—F. B. R.*

A.—Illustrations and drawings of flat toys will be found scattered thru back files of the School Arts Magazine, the Manual Training Magazine and the *Industrial-Arts Magazine.* In the latter, drawings and photographs will be found in the following issues: Mar., 1917, p. 129; Dec., 1917, pp. 500, 502; Feb., 1916, p. 53; Mar., 1916, p. 130; Oct., 1916, p. 458.

The following books contain a number of drawings: *Marten's Manual Training Play Problems,* $1.25, Macmillan Co., New York; *Ben Johnson's Coping Saw Work,* $0.20, Manual Arts Press, Peoria, Ill.; *Sage's Toy Animals I Can Make,* $0.35, Platt & Neck, New York.

It is suggested that the questioner work up his own drawings by developing and adapting illustrations in magazines and books. The children as well as the teachers can make original designs and models.

Carpentry Texts.

879. Q.—I need a book on carpentry and the use of the steel square. Will you please give me references thru your paper?—*C. O. L.*

A.—*Griffith's Carpentry,* $1, Manual Arts Press, Peoria; *Stoddard's Steel Square Pocket Book,* $0.50, Industrial Book Co., New York; *Peker's Steel Square as a Calculating Machine,* $0.50, Industrial Book Co., New York; *Hodgson's A-B-C of the Steel Square,* $0.50, F. J. Drake & Co., Chicago; *Radford's Steel Square and Its Uses,* $2, Radford Architectural Co., Chicago; *Hodgson's Steel Square,* $1, Industrial Book & Equipment Co., Indianapolis, Ind.; *Van Deusen's House Planning,* $0.25, Manual Arts Press, Peoria; *King's Teacher's Handbook of Carpentry,* $1, American Book Co., New York; *Zerbe's Carpentry for Boys,* New York Book Co.; *Radford's Practical Carpentry,* $2, Radford Architectural Co., Chicago; *Roehl's Problems in Carpentry,* Webb Publishing Co., St. Paul, Minn.; *Kilbon's Carpentry for Boys,* $0.75, Lothrop, Lee & Shepard, Boston; *International Library of Technology.* Volumes on Carpentry and Building Construction. International Textbook Co., Scranton, Pa.; *Cyclopedia of Architecture, Carpentry and Building.* American Technical Society, Chicago.

Men's Wardrobe.

880. Q.—I am anxious to secure a working drawing of a chifforobe. Do you have such a drawing, or can you put me in touch with someone who could furnish same?—*C. H. D.*

A.—A perspective drawing and directions for making a chifforobe will be found in Paul D. Otter's Furniture for the Craftsman ($1.50, David Williams Co., New York). The information given is sufficient for any experienced teacher to make his own detailed drawings.

If some manual training teacher is willing to send the correspondent a set of plans the editor will be glad to arrange the details.

Blacksmithing.

882. Q.—Have you a book on Agricultural Blacksmithing?—*S. T. H.*

A.—Drew's Farm Blacksmithing (Webb, St. Paul) will fill the needs of a course in which special attention is to be given to the repair of whiffletrees, horseshoeing, plow repairing, etc.

National Society for Vocational Education.

883. Q.—Kindly send me the name and address of the secretary of the National Society for Vocational Education, and also the membership fee per year.—*J. H. M.*

A.—President, David Snedden, Teachers College, New York, N. Y.; Assistant Secretary, Miss May Allinson, 140 W. 42nd St., New York. The annual dues are $2 for membership and $10 for contributing membership.

Blueprint Reading.

887. Q.—Would you be willing to write me if you know of a book published on the subject of blueprint reading?—*L. O. E.*

A.—*Getty's How to Read a Drawing,* $1, J. B. Lippincott Co., Philadelphia; *Longland's How to Read a Workshop Drawing,* $0.25, Spon & Chamberlain, New York; *Shoub's Reading a Drawing,* $1, Branch Publishing Co., Chicago. *How to Read Plans.* Radford Architectural Co., Chicago, Ill.

Any first-class book on mechanical drawing, like for example, French's *Engineering Drawing* or Crawshaw and Phillips' *Mechanical Drawing for Secondary Schools,* will be most helpful in studying the elements of blueprint reading.

Stencil Fabrics With Wax Crayons.

891. Q.—Can you tell me any way of making wax crayons keep their color when used for stenciling fabrics? I want to use them for stenciling pillow covers.—*L. L. W.*

A.—The editor has been unable to find anyone to give an authoritative answer to this request. If any reader can supply the information, it will be received with thanks for the benefit of the inquiring subscriber. Address Managing Editor, *Industrial-Arts Magazine,* Milwaukee, Wis.

WILL MEET IN CHICAGO.

The Vocational Education Association of the Middle West has announced that its fifth annual convention will be held in the Congress Hotel, Chicago, on January 16, 17, and 18. Information about the meeting may be obtained from Mr. Leonard W. Wahlstrom, Secretary, 330 Webster Ave., Chicago, Ill.

WILL MEET IN ST. LOUIS.

The National Society for Vocational Education has announced that its twelfth annual meeting will be held in St. Louis, February 20, 21, and 22. While the program has not been announced, it is understood that it is under preparation. Inquiries concerning the meeting may be addressed to Miss May Allinson, Assistant Secretary, 140 W. 42nd Street, New York City.